# The Croonian Lectures
## ON
# PLAGUE.

*Delivered before the Royal College of Physicians of London on June 18th, 20th, 25th, and 27th, 1907,*

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## LECTURE IV.[1]

*Delivered on June 27th.*

### NO SPECIFIC TREATMENT FOR PLAGUE.

MR. PRESIDENT AND FELLOWS,—I shall not touch on the specific treatment of plague. Great expectations were raised on the introduction of Yersin's serum but they have not been realised and a serum has yet to be discovered which, while being germicidal in its action, also possesses antitoxic properties. The researches of the late Dr. Allan Macfadyen were directed to the preparation of a serum with these double properties, but his untimely death at a moment when he appeared to be on the verge of success has postponed an early solution of this problem, though the researches have, I think, shown the direction in which the solution lies.

### CONSIDERATIONS RELATING TO PREVENTIVE MEASURES IN THE PAST.

From the historical part of these lectures it will have been gathered that the discovery of a prophylactic by Haffkine gives the only measure of defence against plague that has not been employed more or less by some authorities in the older epidemics. Isolation of the sick, evacuation of the infected house, and segregation of contacts, disinfection, destruction of animals, and *cordons sanitaires* were employed. Quarantine of ships from infected ports and purification of merchandise according to the methods known at the time were also put into force. How frequently they were successful there are no means of knowing, but the numerous epidemics with the large mortality recorded are evidences of their failure in a large number of instances. The failure was caused mainly by the uncertainty of diagnosis with its attendant delays until the epidemic had become established and by the employment of an improvised and untrained service to deal with the disease. Deficiencies in organisation were attempted to be made up for by stringency and severity in rules. Thus at Windsor in the time of Queen Elizabeth, in order to protect the Court, a gallows was erected in the market place to hang everyone who came from London or brought wares from there during the epidemic of plague. In 1585 three gibbets were erected in different parts of Aberdeen "in case any infected person arrive or repair by sea or land to this burgh, or in case any indweller of this burgh receive, house or harbour, or give meat or drink to the infected person or persons the man be hangit and the woman drownit." These are echoes of the stringent measures taken by Count Barnabo in the fourteenth century to prevent people from plague-stricken places entering his territories. In Europe when plague prevailed the services of medical men as advisers and attendants on the sick were understood and taken full advantage of, but their services as sanitarians, directing and controlling with special knowledge and machinery the fight against epidemic disease, were not known. The idea is a product of the Victorian era, and it is not to be forgotten that the impetus for modern preventive work in medicine both for Europe and for India owes its source to England. In India the idea has developed more slowly than in Europe, the conditions there being less favourable to rapid progress. It began in the appointment of sanitary commissioners to provinces, a sanitary commissioner for the Government of India, and health officers to large towns such as Calcutta and Bombay, and the making of the civil surgeons *ex-officio* health officers of the station and district to which they were attached.

The Indian Medical Service, which does magnificent work in India, is very limited in numbers and being spread over the whole of India has a very scattered distribution. Duties military and civil have been assigned to it, and among the civil are attendance on Government officials, on the civil population, on the prisoners in the jails, on the inmates of the asylums, and on the patients in the local hospitals. Besides these duties the civil surgeon is expected to deal with vaccination and sanitation. There is also a small group of officers attached to the laboratories that are springing up in India. The Indian Medical Service being small and not having been increased proportionately to the increased duties which have been laid upon it by the authorities forgetful of the incident of the last straw on the camel's back, it is impossible, even if its strength were doubled and devoted wholly to preventive medicine, for such an establishment to deal with plague without being supplemented by a large and well-trained native service. There are 145 small towns in the Punjab alone.

It has been recognised for many years past by medical men in India who have paid attention to the subject that the sanitary organisation does not meet the wants of India and that great and fundamental changes are needed. The subject was publicly discussed on a paper read by me at the first medical congress in India held at Calcutta in 1894—i.e., nearly 13 years ago—and as a result of that discussion a deputation from the congress, headed by Surgeon-General R. Harvey, late director of the Indian Medical Service, who was a Fellow of this College, waited on the Government of India and pointed out the urgency and importance of providing a special sanitary service for India which should consist mainly of medical persons specially trained at the medical colleges of India in preventive medicine and which would open up an honourable and useful career in Government service for a number of the more ambitious and well-educated medical students attending the colleges in India. It was felt that just as there are a police service and a medical service there should be a separate and distinct sanitary service which should have its own budget. This was nearly two years before plague reached India, and the recommendation was based on the powerlessness of the system then existing to deal with preventable disease in India. The diseases then in view were cholera, malarial fever, and kala-azar. The appearance of plague in India accentuated the necessity for such a service and to its absence and the employment of improvised agencies consisting mostly of laymen may be partly ascribed a portion of the hostile attitude of the people and of the failure to deal with the disease.

In Europe in former times, in addition to the absence of any specially organised staff to deal with plague and the difficulty relating to diagnosis, there was also, as there always must be in every large epidemic, the difficulty of providing sufficient hospital accommodation for the sick and camps for those who had been in contact with the sick. Under stress of circumstances the fact which had been recognised at an earlier period that it was dangerous to shut up the sick with the healthy in an infected house was lost sight of and the practice came into vogue during the great epidemic in London to quarantine the house and household in an infected house. It was against this practice that in 1720 Dr. Richard Mead, a distinguished Fellow of this College, wrote when Europe had become alarmed by the severe epidemic of plague in Marseilles in that year. Dr. Mead advocated a return to the system which had been practised in Venice and Scotland since the sixteenth century—viz., the evacuation of infected houses, the sick being removed to hospital and the sound to special airy buildings outside the town. He recognised, however, that a time might come when the epidemic had increased to such an extent that this policy was impossible to carry out and that then, beyond fumigation of the house and attention to personal health, there was little to be done except forbidding convalescents to leave the house until a certain time had elapsed. To prevent infection being carried from an infected town to a healthy one he advocated the abolition of *cordons sanitaires* which the Marseilles authorities had adopted and which, owing to the food-supply being thus cut off, added greatly to the miseries of the population without any corresponding advantages. He proposed the substitution of a passport system after the person who came from the infected town had undergone quarantine or observation for a certain time and disinfection of goods.

### MEASURES SOLELY DIRECTED AGAINST INFECTED PERSONS AND THINGS WILL NOT CHECK AN EPIDEMIC.

Writing against a system which favoured the spread of the disease from the sick to the healthy, Dr. Mead's

[1] Lectures I., II., and III. were published in THE LANCET of June 29th (p. 1757), and July 13th (p. 73) and 20th, 1907 (p. 142), respectively.

proposals dealt only with infected persons and infected goods and did not include Fiochetto's recommendation that arsenic should be prepared for the rats after the cats, dogs, fowls, and pigeons in an infected house were killed. It is obvious that if the lower animals, and particularly rats, suffer from plague and spread the infection to men, measures directed solely to infected persons and infected goods will not stay an epidemic. The very slow recognition of this fact has contributed more than any other cause to the spread of plague once the infection has been imported into a new locality and has become established there.

For many years before plague appeared in India my thoughts had been directed to the possibility of preventing disease in man by dealing with the allied disease in animals before it reached man. It was partly with this view that I had carried on for years researches as to the relationship of small-pox in man with certain diseases in animals. When several cases of plague occurred in Calcutta and rats were dying in several houses in a particular quarter of the town an opportunity came in an unexpected manner of putting this view into practice, for it had been observed in Bombay that the mortality of rats preceded plague mortality in man. Steps were accordingly taken to have the rats destroyed in the few houses in which they were observed to be dying with the object of preventing the spread of the disease. The measure met with success and the sickness and mortality among rats were arrested. I left Calcutta in 1897 and it was not until April of 1898 that rats were found again to be dying in the sheds connected with the shipping and with the railways, evidently a fresh importation; and with the mortality came the first outbreak of plague in Calcutta.

In Cape Town, after much delay and experimenting, large quantities of Danysz's virus were used with the object of destroying rats in infected quarters, and it is remarkable that no recrudescence of plague has ever occurred in this town. In Hong-Kong a similar policy of dealing with the dissemination of the disease by rats was carried out and with comparative success, notwithstanding continual importation of the disease from China. Even this measure has its limits and unless directed with intelligence it is not likely to be successful. It is impossible to destroy all rats in a country and any measure having in view this object is destined to fail. General destruction of rats is good in itself and if the inhabitants of a town or village can be induced to join in a general campaign against rats it is a matter for congratulation. The main point, however, is to deal with the infected rats and for this it is necessary to provide an agency to ascertain where they are and to concentrate energy on infected localities.

### PREVENTIVE MEASURES ADOPTED IN INDIA.

With reference to the plague in India the fullest recognition and credit must be accorded to the Government of India for its energetic efforts to prevent the spread of the disease with the agency at its disposal. There can be no question regarding the anxious and strenuous efforts at first made to check and to control the disease. The Government of India did its utmost to encourage the Government of Bombay to pursue an active policy in combating the plague and Bombay did its best. Very large sums were spent for this purpose amounting to at least £500,000 sterling from 1897 to 1900, and another £300,000 for the protection of the other provinces. But the measures were based, with few exceptions, on the view that plague is disseminated wholly by infected persons and infected clothing.

The failure which followed these measures in a country where the sanitary organisation was small and ineffective and where the habits and dwellings of the people favoured the spread of the disease was facilitated by other circumstances. These were the apathetic attitude of the people; the suspicions and alarms aroused by inspection of huts and houses; the opposition, sometimes merging into open hostility, to the removal of patients from their houses; and then, as the disease increased, the panic and flight that followed, with the scattering of the infection far and wide. The difficulties thus met with were immense and a time arrived when it appeared to the authorities that the continuance of active measures for the prevention of the disease was not only hopeless but would raise trouble by exciting generally the hostility of the usually docile and peaceful inhabitants. A general relaxation of measures was accordingly encouraged and the adoption of plague measures was left to the option of the people themselves. In thus avoiding Scylla the authorities do not appear to have been aware of Charybdis. The plague, unchecked, and taking no heed of politics, has gradually shot ahead. Year after year it is gaining ground and the mortality is now producing just those results which were feared would arise from a policy of activity. The disorders and excitability of the inhabitants of the Punjab have come to most people as a shock and a surprise, but they are what history teaches to be inevitable where whole families are swept away and where the people of a country are dying in immense numbers.

The result of a relaxation of efforts proved in the case of the Punjab most disastrous and this has been the case also in other parts of India. For instance, in Berar, a province of nearly 3,000,000 of people, plague was kept well under control for six years. There was no quarantine but notification and surveillance of people coming from infected villages to healthy places and the immediate adoption of preventive measures when a case of plague occurred consisting mostly of evacuation of the infected house and camping out on the outskirts of the village or town. The policy met with remarkable success, notwithstanding constant importation of disease from the Bombay Presidency, Central Provinces, and Hyderabad State, and it was accepted by the people in good spirit so long as the system was believed in by the authorities. But latterly the measures were considered irksome and accordingly they were relaxed. The next season the disease began to spread unchecked and Khamgaon, with a population of 26,000, lost 5000 of its inhabitants in 12 months, and by the end of 1903 and the beginning of 1904 nearly the whole of the province of Berar was infected. In many of the villages the villagers adopted on their own initiative precautions—i.e., vacating their village and camping out at once on the first appearance of a case of plague, or of dead rats, and so escaped an epidemic, while in other villages the villagers were too ignorant or too lazy to take the initiative and adopt precautions and camp out on the first appearance of plague. These almost invariably suffered severely.

There were practically no precautions in force in the city of Nagpur against plague when the second epidemic of plague broke out there in 1903–04 and in five months from November to March there was a mortality of 15,000 in a population of 130,000. Many of the inhabitants took the initiative, vacating the city and camping out, and they escaped, the mortality being among those who remained in the city and who did not vacate their houses.

During the whole ten years one presidency stands out conspicuously as having steadfastly pursued an active policy and of not leaving preventive measures to the option of the people, and this is Madras. The local Government placed full reliance on its experienced sanitary commissioner and its confidence has been amply justified. Under the strong and able direction and administration of Colonel King, I.M.S., assisted with very inferior material as a staff, the plague has been kept under control, notwithstanding the fact that large numbers of infected persons are constantly passing into the Presidency from the neighbouring States.

### IS IT POSSIBLE TO DEAL WITH PLAGUE AS IT NOW EXISTS IN INDIA?

Seeing that plague has reached the proportions it has now attained in India the question arises, Are there any measures likely to be useful in checking the epidemic which, while effective against the disease, are applicable to Hindus and Mahomedans and their mode of life? The answer is yes, but in considering this question the sanitary condition of India and the habits, prejudices, and religious scruples of the people have to be recognised. The sanitary conditions of India, however deplorable they are, have to be taken as they exist. They are similar to those in Europe in the fifteenth century. It is not possible when an epidemic prevails to transform a town or a country into a condition which will supply it with light and well-ventilated houses and which will render it free from rats, fleas, and other agents which play a part in the spread of the disease. Measures which may be desirable but which are impossible have to be distinguished from those that are possible. Under the impossible may be grouped any attempt suddenly to change the thoughts and habits of the people or the condition of their dwellings, or their dislike and hostility to wholesale removal of their sick to hospitals, or any measures based on the supposition that the communities in India can defend themselves against plague without the intervention of the Government.

It has been seriously advocated as a justification of the removal of all plague restrictions that the people, seeing the havoc that plague causes, would be willing to adopt for their own preservation European methods. The havoc has come but not the change in thought or habits of the people. Next comes the advocacy of rebuilding the huts and houses in the infected villages and towns of India, because it has been observed that the incidence was greater in dark, badly ventilated and rat-ridden mud huts than in others and particularly when they were grouped together in such a manner as to form a common tenement for large numbers of families. The scheme is a good one, which will be supported in principle by all sanitarians, but it is obvious that on a large scale the cost is prohibitive and even if the money were forthcoming could only be brought about after the lapse of very many years. In the meantime the people are dying.

The reluctance to be removed to hospital for purposes of segregation is a general one in every country but it is accentuated in the East by the fact that in consequence of the great mortality from plague very few patients taken to the hospital return to their homes. It is necessary to consider the dislike to removal to hospital from the standpoint of the patient and the patient's friends. I remember the difficulty as a rule encountered in getting either Hindu or Mahomedan to be removed to hospital when suffering from small-pox, which is not nearly so fatal a disease as plague. The compromise which had often to be made was to vaccinate everyone in the house and as far as possible in the adjoining houses, leaving the patient to be treated at home, and after death or recovery of the patient the disinfection of the house. A similar procedure is feasible in plague, except, as I shall show afterwards, the house should be disinfected at once. The impossibility of destroying during an epidemic all rats and fleas in a town or province has already been mentioned and measures have to be devised to concentrate the destruction where it will be most useful; liquid chemicals, except perhaps in the case of latrines and also for washing one's hands, are valueless and a waste of money. Possibly an exception may have to be made to this statement regarding pesterine, a preparation of petroleum employed by Dr. J. A. Turner, the health officer of Bombay, and which he has found useful for the destruction of fleas in rooms.

### It is Impossible for the People Themselves on their own Initiative to Combat Plague.

Moreover, it is a fundamental point in any preventive measures in India to recognise the fact that it is impossible for the people themselves on their own initiative to defend themselves against the ravages of plague. One might as reasonably expect each village and town on its own initiative to defend itself against a powerful invading army. With the exception of a few large towns, such as Bombay and Calcutta, the general conditions prevailing in India and the relations of the Government to the people, which are of a paternal and patriarchal character, are opposed to any initiation or carrying out of measures by the people themselves without direction, supervision, and control by the Government. In 1902 the Gujrat district inhabited by Mahomedan agriculturists was seriously affected with plague. The Deputy Commissioner writes: "As a rule the people were extraordinarily patient while the disease was epidemic in the village. Their attitude was entirely that of quiescence. They were willing to take almost any steps they were advised to take so long as someone in authority was present to see it carried out, but if no one was there to see it carried out they let things go as they were before and did nothing." This may be stated to be the general attitude of the peasants and poorer people in India. For centuries the Sircar or Government has been looked up to for guidance and to be told to rely on themselves or anyone else besides the Sircar is not understood.

In 1903 Mr. Maynard, a Deputy Commissioner, in his report on plague operations in the Punjab says: "The measures authorised by the Government are now in some respects behind rather than in advance of what general opinion would approve. It must be realised that the people cannot altogether protect themselves A community that is not completely organised for self-government hardly knows what it wants and certainly cannot enforce its will without external help. It is not fair that it should be at the mercy of selfish or reckless individuals."

The resolution of March 9th, 1904, of the Government of the Punjab points out the unfriendly attitude of the inhabitants of infected villages as among the reasons for leaving measures to the people themselves. With reference to evacuation of infected houses it says: "It is by adopting this measure that the people can help themselves best. They must not, however, look to Government for assistance and establishment. It is out of the question to provide huts or extra police." And on the subject of killing rats it goes on to say: "It has now been decided that it is undesirable to incur any further expenditure on further experiments." This policy was reversed in April, 1907, in the adjoining province of the United Provinces when it was announced in the Legislative Council that the Government had determined to depart from the old policy and to provide shelters for the plague-stricken people who evacuate their homes, £2000 being devoted to that purpose and a special plague committee being appointed to advise as to the methods for fighting the disease and spending the sum mentioned.

It may be taken as an axiom that without a specially trained agency to direct and control the plague measures the essentials in regard to the prevention of the disease are forgotten or misapplied and often useless measures are adopted. Without this agency it is a matter of the blind leading the blind. It is pitiable to read some of the suggestions which are made to deal with plague and which are accepted and carried out in good faith as being likely to check the epidemic. Here an inspector is added to the conservancy staff, there it is a few bheesties or water-carriers, and elsewhere a native surgeon. They are all doubtless useful in their way but as regards influencing the plague the money spent on them is thrown away. Similarly when I was in Poona last year I learnt from the health officer that a sanitary engineer had visited the town with the object of drawing up a drainage scheme, which was an excellent thing in itself and which would cost much money, but it would have no effect on plague, which is the most serious illness from which Poona is suffering.

### The State of Poona in September, 1906.

I consider the keynote of success to the prevention of plague is the provision of money and machinery and of a special plague organisation to direct, to supervise, and, if necessary, to carry out the requisite measures. With such a trained organisation, having yearly conferences to compare notes between the heads of departments, it would be possible to sustain and to carry out a settled policy modified only by scientific research and experience. This is what is needed for India and I shall illustrate the necessity for it by an instance which recently came under my observation when I was in India in September, 1906. At that time plague prevailed in Poona, a town of not more than 120,000 inhabitants. At the last census it numbered 110,000 persons. The town had already in its previous epidemics lost over 30,000 of its inhabitants. This fresh epidemic began with one death from plague in June, followed by 107 deaths in July, 1166 deaths in August, and 1173 deaths in the first 13 days of September. On the day I inspected the registers 90 deaths from plague had occurred before noon. By the time this epidemic was over another 8000 deaths were added, bringing up the total of all the epidemics to at least 40 000 deaths.

Under the guidance of Dr. Satpute, the municipal health officer, I visited the plague-stricken quarters of the town, and I shall never forget the painful impression produced on my mind by the heartrending scenes of distress, despair, and desolation which met me on every side. The town had the appearance of a deserted city. The streets were silent, some of them had scarcely an inhabitant visible in them; the only sounds which occasionally broke the silence as we passed through street after street were the noise and clang of the funeral processions and the wail and cries of the mourners at houses in which a death had recently occurred. In whole streets the shops and houses were closed and in those quarters where shops were open they were served by men who only remained in them during the day and left the city for the night. I visited house after house where deaths from plague were being treated by one or other of the two hospital assistants under the health officer. The patients lay in rooms and passages which were often so dark that it was with difficulty they could be seen. In the house where plague first broke out in 1906 the owner had lost his seven sons during the seven epidemics from which Poona has suffered. Similar tragedies belonged to other houses. These seven epidemics have impoverished the municipality, have destroyed an enormous number of people, have brought ruin and beggary to many families, and have increased the price and scarcity of labour. Falling on the adult population, the labourers have been chiefly affected. The ravages of the plague have, however,

not confined themselves to these classes, for the Brahmins have also suffered heavily. Large numbers of women and girls in all classes have been left husbandless and young girls betrothed to young men have been made widows with no possibility of remarriage but with all the drawbacks before them of an Indian widow's life. The devastation produced by plague is not a mere question of so many deaths but the sickness and suffering, the despair and the losses, and the evils entailed thereby engender other evils and a discontent which it is difficult for any Government to meet, however anxious it may be for the welfare of its subjects.

I shall now pass on to the measures which I found in force to deal with this great epidemic. The staff consisted of Dr. Satpute and three hospital assistants. One of these hospital assistants was employed in disinfecting houses so far as possible and the other two in treating patients at their own homes. Good work had been done so far as such a staff was able to do it but it was a microscopic staff attempting a herculean work: 1200 people had been inoculated since the middle of July—i.e., in the course of two months. The Government granted 8 annas to all the servants who were inoculated and the municipality 4 annas to others. Some 2000 persons had gone out to the municipal health camps which were available for those whose income was less than 16 rupees a month. Some 7000 people had made health camps for themselves on the outskirts of the town. The rich had gone to their country houses and the remainder of the 60,000 had taken to flight. About 20 out of every 100 patients were removed to the plague hospital. 2½ annas daily, with medicine, milk, sago, and sugar, were supplied by the municipality to the poorer patients attended by the two municipal medical officers. Four native medical men were fighting against an epidemic which had reached the proportions I have stated and their energies were devoted mainly to tending the sick. With a trained service available Poona could have immediately had the necessary assistance to deal effectively with this epidemic.

### For Combating Plague in India an Organised Staff and a Policy are the First Essentials Required.

Having considered what is impossible and useless to attempt in India I now come to that which is possible. But before doing so it is necessary to look at the financial position of India, for if there are no funds available to provide money and an adequate machinery then the only policy possible is that which has already been followed with the results mentioned. In any circumstances, when the plague becomes a terror to everyone it is questionable whether attributing the scourge to the hand of God, as was recently done by the Under Secretary of State for India, is the best way out of the difficulty. Evidently Lord Palmerston's rebuke to those who wished to place the blame of the cholera epidemic in England on Providence was forgotten.

As regards finances, with the exception of 1896-97, when nearly £1,500,000 were spent on famine relief, and 1897-98, when over £3,250,000 were similarly spent, there have been large surpluses in the revenues of India during the past ten years. This is not due to money not being devoted to famine purposes, for in 1899-1900 over £2,000,000 were spent in this direction and £1,000,000 have been annually devoted to famine purposes and famine insurance ever since. The figures indicate the liberal, magnificent, and statesmanlike policy carried out in India for the prevention and mitigation of the effects of famine. Hundreds of thousands of lives have in this way been saved.

A similar policy is required in regard to plague prevention, which destroys more lives even than famine. Since 1896 some £17,000,000 sterling have been spent on famine, nearly £1,500,000 on plague, and in spite of this there have been surpluses amounting in the same number of years to over £20,000,000. Of the £1,500,000 spent on plague since 1906 a little over £200,000 have been spent on the Punjab where nearly 2,000 000 people have died. During the years 1905-06, which is the last account available, the Imperial Government of India spent for the plague in the Punjab the sum of £2423 and in Madras £34,603.

The following are the annual amounts spent by the Government on plague in the Punjab and the Madras Presidency since 1897:—

| | Punjab. | Madras Presidency. | | Punjab. | Madras Presidency. |
|---|---|---|---|---|---|
| | £ | £ | | £ | £ |
| 1897-98 | 8,577 | 4,234 | 1902-03 | 51,772 | 24,591 |
| 1898-99 | 19,674 | 46,382 | 1903-04 | 28,980 | 37,277 |
| 1899-1900 | 11,560 | 39,319 | 1904-05 | 19,526 | 52,128 |
| 1900-01 | 21,045 | 13,880 | 1905-06 | 2,423 | 34,603 |
| 1901-02 | 34,532 | 14,592 | | | |

With money available there is no difficulty in providing a special plague organisation for plague work and for supplying it with the requisite material for carrying on an anti-plague campaign. Such a campaign must, however, be based on a well-defined, fixed, and steadfast policy which shall be well known and readily applied. This would not debar modifications being made in the application of the measures according to local circumstances and the discoveries of science. The principles guiding such a policy would be first the discarding of measures which are inapplicable to India and which on that account are bound to be unsuccessful; also of measures which, though useful from a health point of view, have no influence on plague; and, secondly, the steady application of measures known to be of value; for instance, the passport system, inoculation, evacuation, destruction of rats in infected localities, and the disinfection in its widest sense of infected houses. These have all been recommended and tried more or less at one time or another in several places—i.e., locally; but their success depends on their adoption in every province and on the agency and regularity and thoroughness with which they are carried out. With a special organisation provided such measures are possible and without it the attempt to deal with the epidemic is hopeless.

### Measures to Protect Healthy Districts.

Differentiation is required in the treatment of areas in which the disease is endemic and in which it is not. Healthy districts should in every circumstance be kept free from plague. This can be effected as it has been done in the Madras Presidency by a passport system and surveillance and immediate action on the occurrence of a case of plague. No relaxation on any account should be allowed. This should be an imperial policy admitting of no modifications. It is to the interest of the locality concerned and to the interests of adjoining localities which are unaffected. Examples have already been given of the alarming results following relaxation in this respect. A careful inspection of crates filled with goods from infected localities should also be arranged for in order that any dead or sick rats may be immediately discovered and disposed of in a safe manner and the contaminated portion of the goods disinfected; for the same reason an inspection of fodder and loads of grain from infected localities is necessary. The warehouses attached to railways and docks require to be specially watched, also granaries, stables, slaughter-houses, and markets, where rats from infected localities are likely to be imported and spread infection among indigenous rats or where contaminated goods infect healthy rats.

### Measures in Infected Localities.

With regard to infected areas the only measures on a large scale available are inoculation, evacuation, and disinfection of infected houses and destruction of rats. Of these inoculation is by far the most powerful and effective. The feasibility of inoculation in the infected districts and houses, if a suitable agency is employed, is demonstrated by the success of the inoculation campaign undertaken in 1902 in a portion of the Punjab. The scheme as originally planned was to inoculate 7,000,000 of the people at a cost of a little over £50,000. It was a splendid conception and if the time and planning devoted to its realisation had been more liberal and less hurried the organisation would have been on a larger and more complete scale and more adequate for the occasion. Half a million of people, however, were inoculated and an investigation carried out by the Government of the Punjab showed that the mortality from plague among the inoculated was reduced to one-twelfth of that which occurred among the non-inoculated, so that it is estimated that 13,000 lives were saved by inoculation during that season.

The Mulkowal accident which occurred at the commencement of the campaign unfortunately shook the confidence of the Government in the prophylactic supplied and, as I have shown, the laboratory was wrongly held responsible for an accident which was actually due to defective organisation which admitted of faulty technique in the application of the prophylactic at the time of the inoculations. The people themselves, however, appear to have understood that the tetanus was an unfortunate accident and were not in the least deterred from availing themselves of the inoculations any more than people are deterred from railway travelling because an express train has met with an accident. This is apparent from the fact that whereas before the accident happened over 100,000 persons came forward to be inoculated, during the season subsequent to the accident nearly 400,000 were inoculated. Major S. Browning Smith of the

Indian Medical Service, who took an active part in the inoculations, describes the attitude of the villagers in this respect. When he began to give the Amritzar people an account of the Mulkowal accident they said that they had seen for themselves the good effect of the inoculations and the sooner he stopped talking and began working the better they would be pleased. He soon finished the few doses he had with him and he remarks: "The genuineness of their feelings was evidenced by the reproaches of those who had to go away unsatisfied, the reproaches of some of the women taking the form of an abuse which was evidently heartfelt." However, with the Government averse to continuing any sustained effort, little or no further progress was made, and in 1904, when the plague was causing enormous ravages, only 49,000 persons were inoculated in the Punjab. It is stated in the report of the Inspector General of Civil Hospitals, who was in charge of the plague operations, that "no special measures were taken for inducing the people to submit to inoculation and the operation was performed almost solely in response to the spontaneous demands of the people." An attitude of this kind in a grave crisis is unjustifiable. In no country of the world can the peasant population be expected to form an opinion on the merits or utility of a scientific method, and even if its utility were appreciated by them, as appears to have been the case with the 49,000, the initiative and organisation required for providing that the full benefit of the measure shall be secured devolve upon the Government. There is no reason that Haffkine's great discovery should not again be made use of on a larger scale. If it finds favour with the Government to-day it will be in favour with the people to-morrow, but the organisation must be such that in its application in the villages there is not the slightest chance of another accident. I believe a pronouncement exonerating the laboratory would, in the circumstances in which it has been mistakenly blamed, have an excellent effect in reinstating the enthusiasm for inoculation.

There is no reason, moreover, that systematic endeavours should not be made whenever a case of plague occurs in a house to get the inmates of the house, and possibly those of the adjoining houses, to be inoculated, and if the benefits are thoroughly explained to them in their own language and tactfully Indians, like other people, are not averse to avail themselves of anything that is likely to be to their advantage so long as they believe in the honesty of those who are dealing with them. Necessarily, one comes across exceptions who will have none of it, but these sort of people are not confined to India. Inoculation is the cheapest mode of protection. The cost of vaccines, establishment, and equipment works out to less than 6 annas per person inoculated, which is not an excessive expenditure. Owing to the original Punjab scheme being abandoned the cost was slightly over 1 rupee a head on the 500,000 inoculated, but if the numbers contemplated—viz., 7,000,000—had been inoculated it would have cost about 1½ annas, or about 1½*d.*, per head. The margin of 6 annas per head will therefore be seen to be liberal.

Evacuation of an infected locality and inoculation promptly carried out will stop any epidemic. In Cape Town plague was becoming serious among the Kaffirs. It was decided to remove them from their dwellings where they were crowded together under most insanitary conditions as bad as, if not worse than, any in India. In the course of a week from 7000 to 8000 were removed to a small village prepared for them and all were inoculated. The epidemic ceased among them and although after two or three days' rest in order that they should recover from the malaise caused by the inoculation they came in regularly to Cape Town and often worked in infected portions of the town they remained free from the disease.

In an infected area the measures to be adopted are controlled to some extent by circumstances. In some localities all the measures mentioned can be brought to bear and of course these are the best conditions for success. But if plague is in a village where there are no means of disinfecting the huts and destroying the rats during the process of disinfection, then evacuation and inoculation are the only measures that can be practised, and if inoculation is carried out the evacuation need only be as long as is necessary to allow of time for the inoculations. Exposure of the grain to the sun, boiling the infected clothes, general destruction of rats, and a general use of pesterine, as advocated by Dr. J. A. Turner, the health officer of Bombay, should also be carried out. In towns where it is possible to carry out disinfection the complicated and unsatisfactory methods belonging to the systems now in vogue should be abolished. When dealing with an epidemic I know of nothing which is more irritating to householders, rich or poor, and which contributes in a greater degree to the hostility met with in disinfecting many houses and to the fostering of surreptitious removal of infected clothing than the fact that everything suspected has to be removed to a central station for disinfection by steam, that the furniture and house have to be sprayed and washed with disinfectants, and that the inmates of the house are turned out for nearly a fortnight before they can get back again. It is exceptional if during the several procedures some articles are not lost or spoilt. At the end of the disinfection, even with careful work, insects will often be seen in the tropics to survive, while the process has no effect on the rats or the rat runs. For these reasons I would abandon all disinfection of this kind and substitute a system of fumigation by a gas which shall disinfect everything *in situ*, which shall, in addition to destroying the germs of the disease, kill the fleas, bugs, other insects, and rats, and which shall disinfect the rat runs in the house.

The Clayton method of disinfection, which consists in the pumping of sulphurous acid gas with sulphuric anhydride into the house, destroys not only the plague germ but all rats, fleas, bugs, and other insects in the house, and it can be applied to thatched huts with the same effect. The gas is generated by burning sulphur at a high temperature in a specially constructed portable apparatus which is brought to the front or back of the house and which is not unlike the vacuum carpet cleaners. One pipe from the apparatus conveys the sulphurous acid gas previously cooled down to a normal temperature into the house, and another pipe also connected with the apparatus draws the air out of the house and through the furnace. Gradually the air in the house becomes saturated with sulphurous acid gas and it has been established that a few hours' exposure to a 2 per cent. gas in the different rooms is destructive to insects, rats, and the plague germs. Not more than seven hours would be required for each operation. The advantages of this method of disinfection are that no occupant of a house need evacuate the house for more than 24 hours at the most, that no furniture, bedding, nor clothes require to be removed from the house, so that there is no risk of the articles being mislaid or stolen. Everything is disinfected *in situ;* the only articles that require to be removed are such foodstuffs as flour, fresh fruits, fish, and meat. Rice and grain need not be removed and would be disinfected along with the other contents of the house. As rice and grain are the most common foodstuffs and the most liable to be contaminated by infection their disinfection is most important. Any discolouration of exposed metal or silk-stuffs can be immediately removed by a weak solution of ammonia without any damage whatever, and a very important fact in connexion with this mode of disinfection is that even such things as become tarnished by direct exposure to the gas are unaffected when they are covered with cloths or are in closed boxes and yet they are disinfected. The gas also has a certain penetrative power into the soil. As stated previously, the disinfection is as applicable to huts with thatched roofs as to houses and more than one series of pipes can be attached to one machine and blocks of houses can be disinfected with several machines in such a manner that the rats, old and young, are prevented from migrating from these blocks and so get destroyed and the infected rat runs are also disinfected. In the case of a plague patient being in the house and objections being raised to removal to hospital the patient can be made comfortable in a tent during the fumigation and be removed back to the house after 24 hours, for with the rats and insects destroyed there would be little danger of the spread of the disease. After the patient had recovered or died the house could be again disinfected.

### How to Prevent Recrudescence at Poona.

From a practical point of view it might be asked what can be done with Poona, which has had 40,000 of its inhabitants die from plague since 1896 and which suffers from plague nearly every year. The town is being ruined and is there nothing that can be done to save it? I believe that if measures were taken on a sufficiently large scale and on an organised plan it is possible to rid Poona of its recrudescent plague, and when this is done then imported plague might with care be kept fully under control. For

this purpose it would be necessary not only to carry on a campaign against the rats by poison and by Danysz's virus but to disinfect every house, block by block, in the town in such a manner that the rats, fleas, and plague bacilli in the houses and rat runs were destroyed. It is possible to disinfect by Clayton's machines every house in Poona in the course of six months at an approximate cost of £1 a house, exclusive of the plant. I have not been able to ascertain exactly the number of houses in Poona but there are certainly not more than 20,000. After the disinfection the plant, with the exception of two machines, could be used for other towns or districts. The two machines left would be sufficient, with the other precautions, to prevent the disease when imported from spreading and assuming epidemic proportions.

### CONCLUSION.

It will be noted that my whole thesis in this lecture is based on the necessity of the formation of a special and trained plague service for the prevention and mitigation of plague in India. If this service is organised on proper lines and on a liberal basis the rest will follow. But steps must be taken for it to be done quickly if more stupendous disasters than those of the present year are not to follow and if the great danger to the people of India is to be averted.

# Three Clinical Lectures
ON
# GENERAL SURGICAL ANÆSTHESIA.

*Delivered at the London Hospital,*

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EMERITUS LECTURER ON ANÆSTHETICS.

## LECTURE II.[1]

*Delivered on June 21st, 1907.*

### THE TWO DISTINCT VARIETIES OF SURGICAL SHOCK MET WITH DURING GENERAL ANÆSTHESIA.

GENTLEMEN,—I hope to-day to be able to interest you in a subject of considerable importance—the incidence of surgical shock during general anæsthesia. The subject is important not only intrinsically but also because by its careful and clinical consideration we shall, I think, be able to explain some of those mysterious deaths which occur immediately an operation is begun during light anæsthesia and because, as I shall hope to prove to you, the anæsthetist has it in his power, by carefully selecting the anæsthetic and adjusting the degree of anæsthesia, to prevent and successfully treat most cases of surgical shock. I need hardly remind you that the operations and procedures of surgery are capable of producing very definite effects of their own upon unconscious patients. Some of these effects are so obviously dependent upon the operation that no mistake as to their origin is possible; others, however, may so closely simulate those arising from other causes, such as the action of the anæsthetic itself, that mistakes as to their true nature may readily be committed. Time will not permit me to-day to deal with all the phenomena which may arise as the direct or indirect result of surgical procedures during general anæsthesia. I must, therefore, omit all reference to the interesting but difficult question as to the nature of the phenomena which may occur when operations are ineptly commenced so early in anæsthetisation that pain is actually experienced, although it may possibly be subsequently forgotten. I propose, in fact, to deal only with the thoroughly unconscious though not necessarily deeply anæsthetised patient. I must also exclude from consideration the effects of profuse or continuous hæmorrhage during general anæsthesia, although you will readily understand that the phenomena which I am about to discuss to-day are frequently associated with phenomena referable to hæmorrhage. Similarly modifications in general anæsthesia resulting from the adoption of certain postures, from prolonged cutaneous exposure, or from the entry of air into veins will not admit of discussion on this occasion. I propose, in short, only to bring before your notice to-day certain more or less sudden states which may arise during artificially induced unconsciousness—states which are referable to violent nerve stimulation or nerve injury in the course of some surgical operation and to which the term "surgical shock" may therefore appropriately be applied.

Soon after the introduction of anæsthetics into practice it became obvious that surgical operations, and particularly certain surgical operations, were capable of producing in anæsthetised patients certain special effects of their own quite apart from those referable to hæmorrhage. Thus as far back as 1853 Bickersteth of Liverpool recorded cases in which sudden but usually temporary pulse disappearance had occurred at the very moment that some particular surgical procedure was taking place, and he believed that certain of the chloroform fatalities which had then been chronicled were to be ascribed to the shock of the operation. In subsequent years other observers also recorded instances in which during such procedures as the division of the optic nerve, the removal of the testicle, or tooth extraction sudden syncope arose. Now, although I do not deny that surgical shock such as we are considering may, under certain conditions, prove fatal, I wish to impress upon you the important fact that by thoroughly understanding the circumstances in which this surgical shock may arise the anæsthetist may usually, if not invariably, prevent it assuming dangerous or fatal proportions. At the present moment the subject is surrounded by an atmosphere of doubt and dogma and if we can in any way clear that atmosphere an important step will have been taken.

There are at the present time two prevalent misconceptions concerning surgical shock. One of these is that this condition when it arises during general anæsthesia is necessarily a primarily circulatory state, whereas, as I shall presently explain to you, it may start by reflex respiratory embarrassment or arrest and only acquire circulatory importance after the respiratory embarrassment or arrest has existed for some little time. There are, indeed, two distinct varieties of surgical shock—the *respiratory*, in which respiration is primarily and reflexly affected, and the *circulatory*, in which circulation is primarily and reflexly affected. If, as may happen, respiratory shock becomes associated with a failing circulation, or if circulatory shock becomes associated with a failing respiration, a state of *mixed or composite shock* becomes established. The second misconception is that circulatory surgical shock is essentially a phenomenon of light anæsthesia, whereas it is exactly the reverse, for it is met with, as a general rule, after the corneal reflex has been abolished, and therefore at a stage in anæsthetisation when it may easily be, and frequently is, mistaken for simple over-dosage. It is curious that this second misconception should have prevailed for so long. The most likely explanation of the persistence of this erroneous belief is that in a large number of the cases in which it has been supposed that primarily circulatory shock has arisen during light anæsthesia a mistake in diagnosis has been made and that a primarily *respiratory* condition has in reality been present. Respiratory shock is, in fact, the shock of light anæsthesia and circulatory shock that of deep anæsthesia. For upwards of half a century this second misconception has been permitted to influence the profession, with the result that a large number of lives have been sacrificed. You will readily understand that when once the error has been committed of mistaking sudden and primary respiratory arrest for sudden and primary circulatory arrest the consequent error will almost certainly be committed of applying restorative measures to the circulation instead of to the respiration, with the result that in certain cases valuable time will be lost and a fatal result follow.

Minor degrees of reflex respiratory and of reflex circulatory disturbance, as the result of some surgical procedure, are very common in practice and usually attract little or no attention. When, however, the conditions are favourable the respiratory embarrassment or the circulatory depression, as the case may be, may be very noticeable, and it is with these definite or acute conditions that we are here particularly concerned.

### RESPIRATORY SHOCK.

The subjects most likely to display respiratory shock are those whose air passages are, from some natural or pathological cause, specially liable to become obstructed. Young and vigorous subjects, those of obese habit, and those

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who have smoked or drunk to excess, are also more liable than others to reflex respiratory derangement. Healthy patients with good cardiac action, although more likely than old and feeble subjects to display this form of surgical shock, are better able than the latter to hold out against the strain which it imposes upon the circulation. Respiratory shock may be met with under all anæsthetics but it is perhaps more prone to arise when the anæsthetic is one which itself throws some strain upon respiration. The degree of anæsthesia which is most favourable to the occurrence of respiratory shock is undoubtedly a light or moderate degree. Reflex respiratory disturbance is rare when full anæsthesia has been secured, although cases occasionally occur in which reflex tongue retraction causing stertor and particularly reflex laryngeal spasm causing stridor arise even though the corneæ are completely insensitive. The operations which are most likely to induce the condition under consideration are those upon the rectum and genito-urinary organs, and those within the abdominal cavity. The dilatation of the sphincter ani of a muscular man whose corneal reflex has not yet disappeared is almost always attended by some degree of respiratory embarrassment due to reflex tongue retraction, or laryngeal spasm, or both. Skin incisions, the wrenching of stiff and painful joints, and the passage of a catheter may also be given as examples of procedures which may, in favourable circumstances, bring about reflex respiratory arrest. The phenomena which lead up to respiratory shock usually occur in the following order. (1) There is a more or less sudden alteration in respiration due to muscular spasm within or about the respiratory passages and usually, though not necessarily, characterised by stertor or stridor; there is consequently (2) a more or less sudden diminution in the quantity of air entering the lungs which rapidly leads to (3) lividity or cyanosis. In certain cases the asphyxial state thus set up quickly leads to (4) venous engorgement and swelling of the tongue, fauces, palate, and adjacent structures, so that the obstruction becomes intensified. Finally, if respiration be not re-established pallor, pulselessness, and death ensue, the rapidity with which the case thus terminates depending upon the particular anæsthetic employed, the degree of anæsthesia at the moment of the seizure, and the state of the patient's cardio-vascular system. Cases frequently occur in practice in which some surgical procedure—e.g., persistent peritoneal manipulation—keeps up persistent laryngeal spasm as evidenced by the persistent stridor, and as the result of this spasm the patient's condition very materially suffers, the face becoming increasingly dusky and pale and the pulse feebler and feebler. I need not give you examples of cases of this class. They are by no means uncommon, but they are very frequently misinterpreted and the unfavourable symptoms wholly ascribed to the anæsthetic. The character of the phenomena in any given case will vary with the circumstances present—the type of subject, the state of his upper air passages, the stage of anæsthesia, the nature of the procedure, and other factors.

Most of you are doubtless aware of the teaching that patients should not be operated upon until they are "well under" but I venture to hope that the considerations which I have placed before you will help you to understand the reasons upon which this teaching is based. There is in every case a particular point or juncture at which the operation should be begun, and if, from hurry or other causes, the surgical stimuli be prematurely applied the respiratory disturbances thus initiated may assume dangerous proportions. I need not weary you with details of cases. It is sufficient to say that intercurrent asphyxial symptoms demanding the most active treatment may thus arise as the immediate result of some surgical procedures during partial anæsthesia. In the most marked case which has come under my own personal observation the secondary venous engorgement of the tongue and adjacent structures was so intense that it was impossible to re-establish the airway to the larynx; artificial respiration proved unsuccessful; laryngotomy became necessary, and the patient's life was only saved by direct lung inflation.

The preventive treatment of respiratory shock is self-evident. It is to secure deep anæsthesia before the operation is commenced. As to the immediate treatment the operation should be suspended, the lips and face briskly rubbed with a towel, the teeth separated, the fauces stimulated with the finger-tip, the tongue pulled forwards if necessary, and artificial respiration performed. Generally speaking this treatment will cause a rapid subsidence of the asphyxial phenomena and respiration will be resumed. Should it fail laryngotomy and direct lung inflation must be resorted to. The head should not be lowered, nor should the patient's body be inverted. Drugs must be studiously avoided.

### CIRCULATORY SHOCK.

I find that I have careful notes of 71 cases in which circulatory surgical shock has occurred during general anæsthesia. This does not, of course, represent anything like the total number of cases in which I have met with this condition. During the first ten or 12 years of practice I employed ether much more frequently than chloroform in general surgical work, and as circulatory shock is comparatively rare under the former anæsthetic I naturally came across but few cases of this condition. But during the last ten years I have employed chloroform, usually after nitrous oxide and ether, in most surgical cases and have gradually become alive to the frequency of intercurrent circulatory changes referable to surgical stimuli. The result has been that whenever circumstances have permitted I have taken notes of the most marked of my surgical shock cases. The subject has, in fact, proved to be an exceedingly interesting one and well worthy of clinical study.

It is difficult to say whether certain subjects are more liable than others to the ordinary (circulatory) form of surgical shock during general anæthesia. I am unable to discover any such predisposition in my records of the most marked cases which have come under my immediate notice. Of the 71 cases of circulatory shock of which I have notes 25 were males, 45 were females, and in one the sex is not stated. Their ages ranged from five to 75 years. These figures are, for obvious reasons, of little or no statistical value. Whilst one would naturally regard elderly patients and those who are at the time in a bad general condition as more likely than others to be affected, one has to remember that it is in these very subjects that one is usually able to work with that comparatively light anæsthesia which, as I shall point out to you, tends to ward off circulatory shock. In anæsthetising a young and vigorous patient one generally has to administer a comparatively large quantity of anæsthetic in order to abolish reflex movement and, if chloroform be in use, it is this deep anæsthesia which predisposes to circulatory shock. Patients with morbus cordis, who, as a general rule, tolerate a comparatively light anæsthesia very well, frequently surprise the surgeon by passing through a formidable operation without any marked pulse disturbance. In a few of my cases I have been informed that the patients have suffered with a "weak heart" or have been "liable to faint," and it is quite conceivable that there may be something more than mere coincidence in this fact. It may be that such patients are specially susceptible to circulatory shock, but so far as I am aware there is no direct evidence on this point, nor is there much evidence that elderly and feeble subjects, in whom circulatory shock takes place during an operation, are more prejudicially affected, so far as their recovery is concerned, than more vigorous patients. As to the anæsthetic or anæsthetics under which circulatory shock is most common there is no doubt whatever that chloroform is *par excellence* the agent which specially predisposes to this condition owing to its power of reducing blood pressure. It is clear that in the event of the surgical procedure producing temporary cardiac inhibition or vaso-motor depression, syncope will be far more likely to arise in a patient whose arterial tension is at the moment low than in one whose tension is at the moment high. Circulatory surgical shock is, indeed, comparatively rare under nitrous oxide and under ether, these anæsthetics causing little or no fall of blood pressure. Of my 71 cases chloroform was being used in 37, C.E. or A.C.E. in 22, and ether in 12, when the symptoms occurred. The next point is one of great interest and importance. It is that surgical shock is a phenomenon of *deep* anæsthesia, being a comparatively rare incident when the corneal reflex is present. This, again, is readily intelligible, for all physiological blood pressure tracings show a *progressive* fall of pressure as chloroform anæsthesia deepens and it is when this anæsthesia is fully established that the patient becomes specially susceptible to the ordinary form of surgical shock. If the operation be of such a nature that the anæsthetist can keep up a moderate anæsthesia—i.e., a state in which the corneal reflex is present—he will be able, as a general rule, to

*prevent* circulatory shock. The operations in which I have most frequently met with this complication of general anæsthesia have been those within the abdomen, those upon the kidney, and those upon the breast. It must be remembered, however, that these operations are amongst the commonest in major surgery. Of my 71 cases of circulatory shock, 26 occurred during intra-abdominal operations, 12 during breast operations, ten during renal operations, six during rectal operations, five during gynæcological operations, five during deeply seated operations upon the neck, three during vesical operations, one during a tongue operation, one during the passage of a lithotrite, one during a skin incision, and one during an operation for castration. Traction upon the intestine, stomach, or omentum, partial or complete evisceration, dragging upon the uterus, ovary, or gall-bladder, and similar procedures are specially likely to produce circulatory shock during deep chloroform anæsthesia. I have known sudden and apparently alarming syncope to be caused by the operator passing his finger behind the pectoral muscles and pulling them forwards prior to their division in the course of an ordinary breast operation. Operations in the neighbourhood of the vagus are also liable to be attended by sudden circulatory shock. For obvious reasons operations upon the brain and spinal cord frequently cause severe shock and call for special care on the part of the anæsthetist. During the operation of prostatectomy whilst the prostate is being removed there is also a tendency for the pulse to vanish completely and in severe cases for respiration to cease as the result of the temporary suspension of cerebral circulation. Rectal, gynæcological, and other operations within and upon the genito-urinary organs are also liable to cause circulatory shock in patients deeply under chloroform or a mixture rich in chloroform. My experience in anæsthetising for ophthalmic operations has been very limited, but I may remind you that cases of sudden fatal syncope during the division of the optic nerve have in past years been recorded. As to operations within and about the mouth, the nose, and the throat, these have been, in my experience, remarkably free from circulatory shock, probably because in such cases one generally maintains a moderate as opposed to a deep anæsthesia. With two possible exceptions, indeed, I have never met with this complication in nose or throat cases, although I have administered chloroform (after ether) in the sitting posture in many hundreds of such cases. Tooth extraction during nitrous oxide anæsthesia is practically never attended by circulatory shock for reasons which you will understand after what I have already said. It is probable that in most of the reported cases the state was one originally respiratory in character. Similarly, extensive skin incisions more often primarily disturb respiration than circulation. I have never seen circulatory shock during an operation for mastoid disease.

The clinical phenomena of circulatory surgical shock may vary from a barely noticeable effect upon the pulse to the most alarming and apparently fatal syncope. In mild cases there may be nothing beyond a slowing, feebleness, or irregularity of pulse, possibly coupled with slight pallor, the respiration remaining unchanged and perfectly satisfactory. In more marked cases these symptoms are associated with some coldness and perspiration of the nose, forehead, and other parts, a loss of normal moisture inside the lips, a slight separation of the eyelids, and a lessening in the depth of respiration. A change from stertorous to tranquil breathing is a noticeable phenomenon in some cases and is interesting as supporting the view that stertor is usually a spasmodic rather than a paralytic phenomenon. The disappearance of stertor is probably analogous to want of closure of the lids. In the most acute cases pallor and pulse disappearance, wide separation of the hitherto closed lids, marked dilatation of the pupils, and suspension of respiration are the prominent manifestations, the symptoms occurring roughly in the order named, but possibly in such rapid succession that the whole seizure appears to be momentary. In the case already referred to, in which acute shock occurred as the result of vigorous traction upon the pectoral muscles, the patient presented all the appearances of sudden death. I have observed a precisely similar appearance of the patient during certain deeply seated operations in the neck, probably from direct interference with the vagus. In several cases I have noticed that the pulse, although very slow, has retained a fair volume during the few beats which have immediately preceded its cessation. In others, a curious batch of deep respirations—five or six in number—has been a prominent feature of the acute seizure, the batch occurring immediately before breathing has ceased. In a few cases I have observed *local* pulselessness. Thus during an abdominal exploration in a jaundiced patient whose arms were pinned up both radial pulses disappeared, although the temporal artery could be felt beating. The anæsthetic in use at the time was chloroform and the patient was fully, but not too deeply, anæsthetised. Although the depth of anæsthesia was lessened and the C.E. mixture substituted for chloroform, the radial pulses remained absent till the abdomen was being closed when, the arms still being pinned up, the wrist pulses returned. I have met with a somewhat similar case in a child during a mastoid operation, the radial pulse of the opposite side twice becoming imperceptible during the operation. In this case, as in the other, the patient's posture doubtless favoured the pulse disappearance, a slight pressure upon or flexion of certain arteries being quite sufficient, with the general low pressure present, to arrest the pulse.

There are two important clinical points in these cases—viz.: (1) that the shock is essentially one which is primarily circulatory, respiration only ceasing when the pulse has vanished; and (2) that even though the shock be acute and threatening in its manifestations it is almost invariably of a transient character. It will be convenient to say a few words on these two points.

1. The clinical phenomena of the cases now under consideration would seem to indicate that the surgical stimuli to which reference has above been made, acting through sensory or sympathetic nerves, primarily affect, in most cases, both the cardio-inhibitory and the vaso-motor centres, with the result that a fall in blood pressure takes place, the degree of which is in direct proportion to the severity of the stimulus and to the extent to which the blood pressure had been lowered by the anæsthetic when the nerve injury occurred. According to Crile, whose physiological researches on surgical shock are now well known, the condition is principally one of vaso-motor paralysis brought about by the nerve injury paralysing the main vaso-motor centres, the result of the paralysis being a fall of blood pressure and an accumulation of blood within the venous system and particularly within the vessels of the splanchnic area. Crile does not apparently attach much importance to the cardio-inhibitory element in surgical shock, but clinically there would seem to be certain cases in which the cardio-inhibitory effect is more conspicuous than the vaso-motor effect. I have, for example, often met with simple bradycardia or with temporary cardiac arrest without pallor or any other noticeable symptoms during certain operations under ether, during others under moderate chloroform anæsthesia, and during others, again, under chloroform administered to the full surgical degree to patients in the Trendelenburg posture. Crile does not appear, moreover, to have studied the effects of given stimuli in different degrees of chloroform anæsthesia or the effects of such stimuli under different anæsthetics administered to the same degree. There can be no doubt, however, that in human beings these different conditions are of considerable importance, as already indicated.

2. The essentially evanescent character of typical surgical shock during general anæsthesia has been a conspicuous feature in practically every case of which I have notes. Of 71 cases, not one was fatal; and although in some of them I felt considerable anxiety I am gradually coming to the conclusion that there is little or no occasion for alarm. Even in the most marked cases recovery came about within a couple of minutes at the outside, and in many of them within a minute. At the same time I can readily conceive that with a deeper chloroform anæsthesia than that which existed, or with less prompt or wrong treatment, serious results might have occurred.

When respiratory shock becomes quickly followed by circulatory depression, as may be the case in weakly subjects and in those with degenerated cardio-vascular systems, or when circulatory shock is so acute that respiration rapidly ceases as the result of the sudden cerebral anæmia, a state of mixed or composite shock becomes established.

The diagnosis of circulatory shock is an important matter, for upon it depends the proper treatment of the condition. It is distinguished from: (1) respiratory shock by the initial phenomena being circulatory, the pulse changes, pallor, &c., occurring before any respiratory effects are observed. In respiratory shock, moreover, there are, as a rule, muscular spasm, stertor or stridor, and cyanosis; whilst

in circulatory shock there is, as a rule, no muscular spasm, stertor, or stridor, and the colour is pale rather than cyanotic. It must be remembered, of course, that cases occasionally occur in which both varieties of shock co-exist as above mentioned. Circulatory shock is frequently mistaken for (2) simple chloroform over-dosage or toxæmia; and it must be confessed that in many cases it is difficult, if not impossible, to distinguish the two conditions. I have already stated that circulatory surgical shock does not, as a rule, occur when the corneal reflex is present. If it occurred during light anæsthesia we should not, of course, have any difficulty in diagnosing it from simple chloroform syncope. But as deep chloroform anæsthesia specially predisposes to circulatory shock it will be obvious to you that when chloroform is being pushed to full narcosis and when during the process sudden syncope arises it is often very difficult to say whether this syncope is or is not purely toxic. In going through the notes of many hundreds of administrations I find that in nearly every case in which *sudden* symptoms have occurred under chloroform these symptoms have arisen during some operation liable to produce shock. It is only within recent years that I have been forced, by the chain of clinical evidence, to place this interpretation upon the cases to which I am now referring. I believe, indeed, that the surgical procedure is far more frequently the direct cause of pallor and pulselessness under chloroform than is generally supposed—in other words, that the mistake is frequently made of ascribing to the anæsthetic symptoms which are only partly dependent upon its action. That the anæsthetic cannot be altogether absolved is proved by the fact that acute circulatory shock as, for example, from intestinal traction, does not occur during *moderate* chloroform anæsthesia—i.e., when the corneal reflex is distinctly present. The blood pressure must, in fact, be already reduced for the typical phenomena to arise. One of the great pioneers in abdominal surgery was in the habit of operating under what we should now term moderate anæsthesia. Reflex movement of the legs, reflex abdominal rigidity, occasional "straining," &c., very frequently occurred, but it was found that provided the breathing were satisfactorily performed the circulation was well maintained. Unfortunately, this moderate anæsthesia is impracticable in the abdominal surgery of to-day and it hence happens that the door is opened to circulatory shock by the deeper anæsthesia which is required. Circulatory shock in its typical form may generally be distinguished from pure chloroform over-dosage or toxæmia by its suddenness, by its occurring at the moment of some particular nerve injury, and by the rapidity with which the patient passes from deep to light anæsthesia when the anæsthetic is withheld and remedial measures are applied. Cases constantly occur in practice in which the true surgical character of some circulatory disturbance under chloroform becomes conclusively proved as the administration proceeds, the symptoms vanishing as the nerve injury subsides, although the depth of anæsthesia remains the same. Moreover, it sometimes happens that a particular surgical procedure capable of producing circulatory shock is repeated after an interval, during which the surgeon is engaged in a stage of the operation not involving shock, and the anæsthetist may distinctly recognise two periods of pulse depression, more or less acute, coincident with the two procedures in question. Thus the introduction of a large sponge into the abdominal cavity prior to some operation upon the stomach or bowel is very liable during deep chloroform anæsthesia to produce pallor, pulse depression, and coldness of the forehead. When the sponge is *in situ* and the surgeon is engaged in introducing sutures (the patient still being deeply under chloroform) the symptoms of shock disappear. Subsequently, however, when the sponge is removed (the patient still being deeply under chloroform but with a good pulse and colour and a warm forehead) the symptoms of shock recur. It is not a difficult matter, as a rule, to diagnose pure circulatory shock from (3) circulatory depression due wholly to hæmorrhage, the circumstances in which the pallor and pulse depression arise being sufficiently indicative. Sometimes, however, when a considerable quantity of blood has been lost and the surgeon is disturbing important parts, the symptoms of the patient may be due partly to one cause and partly to the other. As a general rule circulatory shock occurs comparatively early in operations and is characterised by slowness of pulse, whilst circulatory depression from hæmorrhage is generally met with in the later stages and is characterised by rapidity of pulse. Circulatory shock must also be differentiated from (4) intercurrent asphyxia due to such causes as the latero-prone or prone posture, the presence of mucus or blood within the larynx or trachea, &c. In all of these there is, as in respiratory surgical shock, an initial stage of respiratory embarrassment attended by lividity or even cyanosis, and the circulatory depression is a secondary phenomenon. At the same time it is not always an easy matter to say, in any given case, to what extent circulatory depression is due to circulatory shock, to respiratory embarrassment, or to hæmorrhage. I have known this difficulty in diagnosis to arise in a case of laminectomy; but as the pulse almost at once returned when the patient was moved from the prone into the lateral position it became clear, at all events in that particular case, that the circulatory depression was largely of respiratory origin. Lastly, sudden circulatory shock may be simulated by (5) the entry of air into a vein, but when the latter event produces acute symptoms the characteristic sound is generally to be heard.

The preventive treatment of circulatory shock rests partly with the surgeon and partly with the anæsthetist. With the measures generally adopted by the former we are hardly concerned on the present occasion. They are specially likely to be beneficial in feeble subjects about to undergo formidable operations. Amongst these measures may be mentioned the envelopment of all parts of the body except the part about to be operated upon in flannel or cotton wool, the maintenance of a room temperature of from 65° to 70°, and the administration of an enema of beef-tea and brandy just before the anæsthetic is given. Some surgeons have great faith in a preliminary injection of strychnine, but the beneficial effects of this drug are questionable. The preliminary injection of morphine ($\frac{1}{4}$ grain to $\frac{1}{3}$ grain), with or without atropine ($\frac{1}{120}$ grain), is certainly advantageous in carefully selected cases. We probably have in atropine a drug which should be more extensively used than it is at present, but further experience with it is needed before we can speak positively as to its value. Amongst the preventive measures which are in the hands of the anæsthetist I have already directed your attention to the most important—namely, the selection when possible of ether or of a mixture containing ether. Should chloroform be the selected anæsthetic an attempt should be made to retain a trace of corneal reflex when the procedure likely to induce shock is taking place. Should the operation be one which can be performed in the Trendelenburg posture and should chloroform be the chosen anæsthetic the adoption of this posture is certainly a most valuable preventive measure. The prevention of circulatory shock rests much more with the anæsthetist than is generally supposed. Should ether be contra-indicated on general grounds it may perhaps be administered temporarily during that particular part of the operation when the shock is likely to arise, or the C.E. mixture may be similarly used to replace chloroform.

The immediate treatment of incipient and moderate circulatory shock is as simple as it is successful. It is to suspend the anæsthetic and to allow the corneal reflex to return to a slight degree. By this procedure the pallor, the coldness of the face and extremities, the slow and small pulse, and the half-open eye may generally be quickly corrected, and fortunately this return to moderate anæsthesia during circulatory shock is not as a rule accompanied by inconvenient rigidity. A lessening in the depth of anæsthesia when circulatory shock begins to show itself should be looked upon as such an essential part of the duties of the anæsthetist that it should never be omitted. It is probably not an exaggeration to say that a considerable percentage of the more formidable operations of surgery are not completed as the surgeon would have them completed owing to the presence of too deep an anæsthesia. The erroneous dogma that to avoid shock patients must be profoundly anæsthetised still claims its victims and prevents the successful issue of many an operation. The rule should be, the greater the shock the lighter the anæsthesia; and with this rule to guide him the anæsthetist will find that he can frequently tide his patient over a critical period and so enable the surgeon to complete an operation which might otherwise have to be abandoned. Rubbing the face and lips with a dry towel is a valuable adjunct to the simple measure here described. Sometimes a lessening in depth of anæsthesia may with advantage be combined with a substitution of the C.E. mixture for chloroform or of ether for the C.E. mixture. Such a course is indicated in moderately severe cases. Sometimes, too, the patient's body

may with advantage be tilted slightly by placing blocks under the lower end of the table. Should the circulatory shock be associated with shallow breathing the withdrawal of the anæsthetic may be coupled with chest pressure during expiration. In acute cases in which respiratory arrest quickly follows pulselessness the operation must be temporarily suspended, the patient's body drawn towards the anæsthetist, so that the head hangs over the end of the table, and rhythmic chest compression commenced. By alternately forcibly compressing the sides of the chest with the flat hands and relaxing the pressure air may generally be made to pass out of and into the lungs, but if there be the slightest difficulty in securing this end systematic artificial respiration must be practised. As already mentioned, recovery almost invariably takes place within a minute or two. If it be delayed the artificial respiration must be combined with more or less complete inversion of the body. Although the state we are considering is essentially a circulatory one care must be taken to avoid the slightest obstruction in respiration. Personally, I am not a believer in the use of drugs in this condition: lung ventilation and proper posture are the two cardinal remedies. In one of the most acute cases of surgical shock that I ever witnessed the pulse at both wrists disappeared for 20 minutes, but no remedial measures beyond keeping the legs high and the head low and maintaining free respiration were adopted: at the conclusion of the operation (the first stage of Kraske's operation) the pulse and colour had returned and the patient's condition became quite satisfactory. The patient made such a good recovery, indeed, that the second half of the operation was performed in two or three days' time. In exceptionally bad cases in which the patient's condition does not rapidly improve it may perhaps be advisable to administer a saline injection or infusion.

### CONCLUSIONS.

1. Two distinct varieties of surgical shock are met with during general anæsthesia: (1) respiratory and (2) circulatory. In pure respiratory shock the respiration is primarily affected (reflexly), the circulation only failing secondarily. In pure circulatory shock the circulation is primarily affected (reflexly), the respiration only failing secondarily.

2. When respiratory shock becomes complicated by circulatory, or circulatory by respiratory, a state of mixed or composite surgical shock is produced.

3 Respiratory surgical shock, which may occur under all anæsthetics, is most common during *light* or *moderate* anæsthesia—i.e., before the corneal reflex has vanished; whilst circulatory shock, which is far more common under chloroform than under other agents, is met with during *profound* narcosis.

4. The risk of preparing patients or commencing operations before full anæsthesia has been secured is from the *respiratory* and not from the *circulatory* side, as is generally believed.

5. Respiratory shock may arise during any operation, but it seems specially liable to complicate operations upon the rectum, urethra, abdominal organs, uterus, perineum, and kidney. The immediate cause of the respiratory arrest is usually a reflex spasm affecting either (*a*) the tongue, fauces, palate, and adjacent parts, and having stertor as its audible expression; (*b*) the larynx, and producing stridor; or (*c*) the respiratory muscles, and bringing about respiratory spasm.

6. Circulatory shock is chiefly, if not exclusively met with during operations upon parts which possess important nerves or are rich in nerve supply. The immediate cause of the circulatory phenomena is usually a more or less sudden relaxation or paralysis of the vaso-motor system, generally associated with some cardiac inhibition. In some cases the effect produced by the nerve injury is chiefly one of cardiac inhibition.

7. The most favourable conditions for the occurrence of acute and threatening respiratory shock are: (1) partially established anæsthesia; (2) manipulations or operations upon sensitive parts; and (3) the presence of an airway liable to become occluded.

8. The most favourable conditions for the occurrence of acute and threatening circulatory shock are (1) deep chloroform anæsthesia; (2) the horizontal, semi-recumbent, or sitting posture; and (3) intestinal, omental, uterine, or renal traction.

9. Certain subjects, by reason of the conformation of their upper air passages, seem specially liable to respiratory shock, whilst others, possibly from some abnormal instability of their vaso-motor systems, may perhaps be prone to circulatory shock. The state of the heart itself seems to have little or no influence.

10. There may be such a close resemblance between simple chloroform overdosage and circulatory shock under chloroform that the latter condition may be readily mistaken for the former.

11. Whilst surgical shock may undoubtedly be largely prevented by gentleness on the part of the surgeon, its prevention is also largely in the hands of the anæsthetist. The respiratory variety may usually be avoided by securing full anæsthesia before the patient is moved or the operation is begun, and by so adjusting the degree of anæsthesia that reflex modifications in respiration are as far as possible eliminated. As circulatory shock is very rare under ether it may generally be prevented by employing this anæsthetic. Should chloroform or a chloroform mixture be used there are only two ways in which to prevent circulatory shock during certain operations—viz., (1) to avoid too deep an anæsthesia, or if the patient be deeply anæsthetised to lessen the depth of anæsthesia so that the corneal reflex returns; or (2) to place the patient in the Trendelenburg posture. With the rarest exceptions, circulatory shock is never seen in the Trendelenburg posture.

12. The treatment of respiratory shock is to re-establish respiration as quickly as possible by such procedures as separating the clenched teeth, sponging out the fauces, pushing the lower jaw forwards, tongue traction, artificial respiration, and if need be, laryngotomy and direct lung inflation.

13. The treatment of circulatory shock in its milder form is simply to lessen the depth of anæsthesia and to substitute the C.E. mixture or ether for chloroform. In its acute form circulatory shock must be treated by withholding the anæsthetic, lowering the head, raising the feet, and, should respiration show signs of failure or actually cease, by performing artificial respiration. Unless the patient be so deeply anæsthetised by chloroform as to be in peril from this additional quarter recovery from circulatory shock may generally be effected very rapidly—within a minute or two—and the operation may then be proceeded with. Drugs are of little or no value as compared to the lines of treatment here indicated.

## THE CARRIAGE OF INFECTION BY FLIES.[1]

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I PURPOSE to present a few experiments in demonstration of the part which flies are capable of playing as agents in carrying and spreading infection. The experiments were undertaken as opportunity offered to test the value to be attached to the opinion frequently expressed of late years and emphasised by observations in the Cuban and South African campaigns that flies convey on their bodies infective material and contribute to the spread of certain diseases.

The flies used in the experiments were the common house-fly (*Musca domestica*) and the bluebottle (*Musca vomitoria*). The latter is referred to hereafter in this paper as the blue fly. The flies were allowed a limited contact with infective material and then transferred directly to the surface of a solidified nutrient medium in a Petri capsule, and in some instances to a succession of such surfaces. By rotating the capsule, held at an angle, it was frequently possible to make the insect traverse the greater part of the surface of the nutrient medium, and when its transference to another capsule was desired this was accomplished without injury by means of a pair of curved sterilised forceps.

It may be remarked that the form and structure of the fly's foot (tarsus) are such as render it capable of carrying a large amount of infective material. It consists of five segments or "joints" which are clothed with short hairs and armed with numerous bristles and spines. The terminal segment is also provided at its tip with a pair of moveable claws and a pair of membranous flaps (pulvilli)—the latter coming into action on smooth surfaces (Fig. 1).

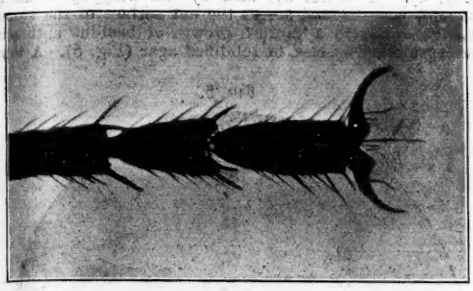
The diseases which were made the subject of the experiments were typhoid fever, swine fever, staphylococcal abscess, pulmonary tuberculosis, and anthrax.

[1] A paper read before the Glasgow Medico-Chirurgical Society on Nov. 18th, 1906.

*Typhoid Fever.*

*Experiment I.*—Six house-flies were caught by means of a net in three enteric wards of the Glasgow fever hospital (September, 1903) and placed in Petri capsules containing a layer of bile salt, lactose agar, with neutral-red and crystal-violet—i.e., the medium of MacConkey[2] modified by

FIG. 1.



Part of a fly's foot showing the claws and pulvilli of the terminal segment and the general armature of bristles and spines. The clothing of short hairs is not visible in the illustration. × 70.

Grünbaum and Hume.[3] This medium favours the growth of bacilli of the colon and typhoid groups, and inhibits most other species. For the sake of convenience and brevity this medium will hereinafter be designated L-R-V-B agar. The flies were allowed to walk over the surface of the medium for a short time and were then withdrawn. A few colonies of coliform organisms appeared on three of the nutrient surfaces but no trace of bacillus typhosus was found. It will be observed that a possible fallacy entered into this experiment inasmuch as the flies were caught in a fly net, the fabric of which would tend to remove any infective material clinging to their feet.

*Experiment II.*—To obviate the possible fallacy mentioned in the previous experiment seven flies were caught by means of sterilised forceps in the enteric wards of the fever hospital and each fly was immediately placed in a Petri capsule containing L-R-V-B agar over which it was allowed to walk for at least five minutes. No growths resulted in any of the capsules.

*Experiment III.*—It was therefore decided to make the test in a more direct manner by bringing flies (collected in the kitchen of a restaurant) into direct contact with the dejecta of typhoid patients—one patient being in the eighth day of illness, two in the eighteenth, and one in the twenty-fifth. This object was attained by placing each fly in a Petri capsule, having in the bottom half a thin film made from a typhoid stool by means of a sterilised swab. The fly was introduced within the Petri capsule before the film had time to become dry, and after walking over the surface for a few minutes it was transferred to the culture medium and allowed similarly to traverse its surface for a few minutes. Thereafter the fly was transferred to a second and in most instances to a third capsule holding a similar layer of L-R-V-B agar or ordinary agar. Many bacteria were deposited on the nutrient surface from the insect's feet in each case and they were numerous in some instances, even on the third surface. From two of the fæcal films the flies were found to have carried typhoid bacilli to the surface of the nutrient medium, but the number of these bacilli was relatively very small. Thus in the case of B—— (eighteenth day of illness) there was only one colony of bacillus typhosus amongst 22 colonies of other species and in the case of L—— (twenty-fifth day of illness) two colonies of bacillus typhosus amongst 60 of other species. No typhoid bacilli appeared on the second and third surfaces traversed by the flies.

*Swine Fever.*

*Experiment IV.*—An opportunity offered itself in an outbreak of swine fever in September, 1905, to test flies alighting upon pigs which had died from the disease and which had been subjected to post-mortem examination. The flies (*Musca vomitoria*) were caught by placing over them when quite still a wide tube of about one inch diameter (a Buchner tube). They at once rose into the inverted tube and were secured by a pledget of cotton wool which was pressed into the tube sufficiently to fix the insects so that they were prevented from moving about and removing any matter from their feet. In this way nine flies were collected from two carcasses and transferred to the laboratory. Each fly was placed in a Petri capsule containing a layer of ordinary agar and allowed to traverse the surface of the medium for about a minute. A very rich bacterial flora appeared on incubation, so much so that the agar was covered by a mixed confluent growth in most of the capsules. The bacillus of swine fever was isolated from one of the capsules. The flies were swarming on these carcasses and on other infective material, and were frequently seen to pass directly therefrom to the feeding troughs.

*Staphylococcal Abscess.*

*Experiment V.* (November, 1905).—Pus from an abscess containing staphylococcus aureus was spread in a thin film in the lower half of a Petri capsule by means of a sterilised swab. A house-fly was caused to walk over this slightly moist purulent film and was then transferred to another Petri capsule containing a layer of agar. After incubation at 37° C. for 48 hours the agar showed a profuse mixed growth in which staphylococcus aureus predominated.

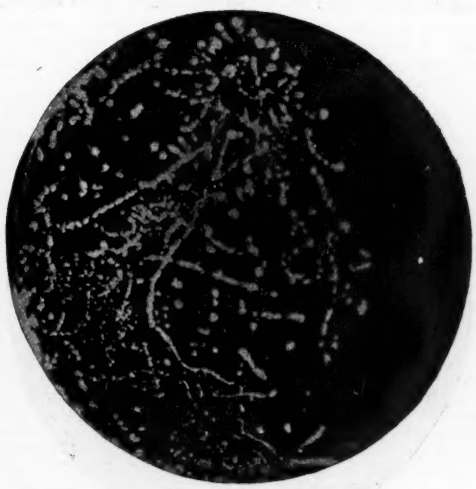
*Pulmonary Tuberculosis.*

*Experiment VI.* (November, 1905).—To test the carrying power of flies in the same way in relation to expectoration a specimen of tuberculous sputum rich in bacillus tuberculosis was spread in a thin film in the bottom half of a Petri capsule. A house-fly was introduced into this capsule and caused to walk over the film for a few minutes. It was then transferred to another Petri capsule containing a layer of agar. On washing the surface of the agar with one cubic centimetre of bouillon and inoculating a guinea-pig intraperitoneally therewith, tuberculosis was induced which killed the guinea-pig in 36 days.

*Anthrax.*

*Experiment VII.*—In the course of the examination of a guinea-pig dead from anthrax (October, 1903) it was observed that a blue fly had gained entrance to the laboratory and it

FIG. 2.



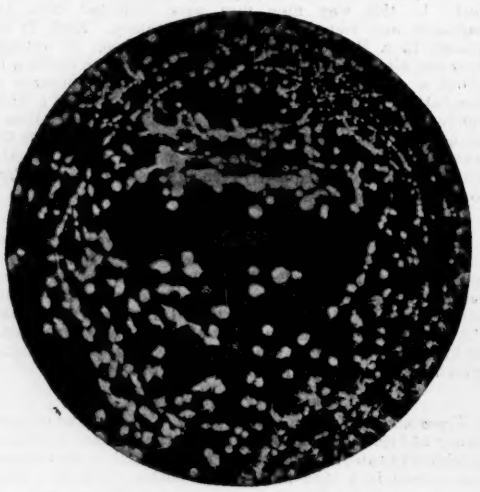
Growth of bacillus anthracis (24 hours) resulting from inoculation of agar surface in a Petri capsule by a blue fly which had just previously alighted on, and walked over, the skinned carcass of a guinea-pig dead from anthrax (Oct. 26th, 1903).

was forthwith decided to make the intruder serve the purpose of an experiment. The fly was accordingly placed under a bell-jar. The carcass of the guinea pig, deprived of the skin and internal organs, was then placed under the same bell-jar. After alighting upon the moist surface of the carcass several times, the fly was transferred to a surface of

[2] THE LANCET, July 7th, 1900, p. 20.
[3] Brit. Med. Jour., 1902, vol. i., p. 138.

agar in a Petri capsule and was allowed to walk thereon for a short time. A second agar surface was provided on which it was also allowed to walk for the same time. Incubation for 24 hours at 37° C. brought forth on both agar surfaces a very profuse growth of bacillus anthracis (Figs. 2 and 3).[4] It was

FIG. 3.

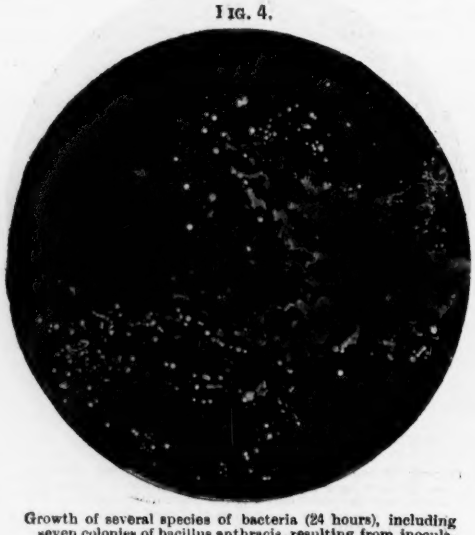


The second agar surface traversed by the same blue fly, showing by the profuse growth of bacillus anthracis (24 hours) the large amount of infection which still remained on the insect's feet after contact with the first agar surface.

not anticipated that the second surface would show so much growth, and it would have been of interest and importance had the cultures been extended in a longer series to determine how many fresh surfaces such a fly was capable of infecting. Its potentialities in the direction were altogether underestimated.

*Experiment VIII.*—With the view of testing the value of these results under conditions of ordinary experience an anthrax carcass (ox) which had been seized by the veterinary

FIG. 4.

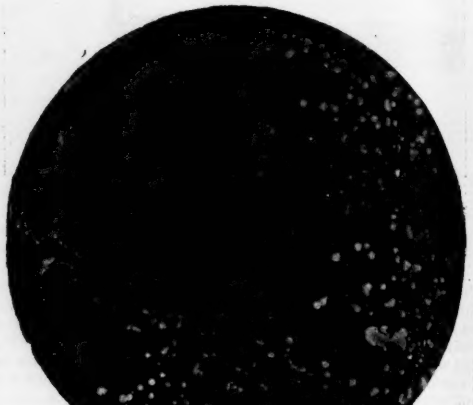


Growth of several species of bacteria (24 hours), including seven colonies of bacillus anthracis, resulting from inoculation of agar surface in a Petri capsule by a house-fly which had just previously alighted on, and walked over, a part of the hind quarter of an imported anthrax carcass (ox) seized in the Glasgow Dead Meat Market (Nov. 15th, 1905).

[4] The photographs illustrating this paper were taken by Mr. W. R. Ogilvie.

surgeon in the Glasgow Dead Meat Market (November, 1905) was made the subject of experiment. A house-fly was placed under a bell-jar resting on one of the hind quarters of the carcass, the surface of the part being quite firm and dry. When the fly had alighted on and walked over the part several times it was transferred to a Petri capsule and caused to traverse the surface of the nutrient medium. After 24 hours' incubation at 37° C. a growth of various species appeared, including seven colonies of bacillus anthracis (Fig. 4). A second fly, held by the wing by means of forceps, was directed across the cut surface of the kidney and gave rise to a profuse growth of bacillus anthracis, amongst other species, on solidified agar (Fig. 5). A third

FIG. 5.



Profuse growth of bacillus anthracis amongst other species (24 hours) resulting from inoculation of agar surface in a Petri capsule by a house-fly which had just previously been allowed to walk over the cut surface of the kidney in the same carcass.

fly, directed in like manner over the cut surface of the thigh muscles, produced a profuse growth of several species, amongst which were found two colonies of bacillus anthracis.

The experiments conclusively show that flies alighting on any substance containing pathogenic organisms are capable of carrying away these organisms in large numbers on their feet and of depositing them in gradually diminishing number on surface after surface with which they come in contact. They further serve to demonstrate the necessity for the exercise of stringent measures to prevent the access of flies to all sources of infection and to protect food of all kinds against flies alighting on it.

Glasgow.

THE ROYAL NATIONAL ORTHOPÆDIC HOSPITAL.—Arrangements for the amalgamation of the Royal National and City Orthopædic Hospitals have now been completed and the patients of both hospitals are being seen in the temporary premises of the amalgamated institution, Nos. 45–47, Bolsover-street, immediately behind the old hospital in Great Portland-street. Dr. J. Hughlings Jackson has been elected honorary consulting physician to the Royal National Orthopædic Hospital and Dr. G. A. Sutherland, Mr. John Poland, and Mr. J. Jackson Clarke have been elected honorary physician, honorary surgeon, and honorary surgeon respectively. The new building operations have been begun and a hospital for 213 in-patients is being built on the site of the old hospital and the adjoining premises. The new out-patient department is to be separated from the hospital and will be on the opposite side of the road, on the east side of Bolsover-street, the hospital and the out-patient department being connected by a subway beneath Bolsover-street. Temporary accommodation for in-patients is provided in three of the vacant wards at Charing Cross Hospital which have been rented by the Royal National Orthopædic Hospital.

# A NEW MICROSCOPICAL DIAGNOSTIC METHOD AND SOME SIMPLE METHODS FOR STAINING LIQUID BLOOD.[1]

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IN a recent publication[2] we discussed certain strings of granules which can be found by means of appropriate staining in a percentage of the red corpuscles in health and disease. We showed that they are the remains of the nucleus of the original cell and called them *chromolinin granulations*. In health they occur roughly in about 1 per cent. of the corpuscles, but in a few pathological conditions which we studied they occurred much more frequently. Thus, in a case of tropical abscess of the liver they were found in 6·6 per cent. of the corpuscles, in a case of chronic malarial anæmia in 11·5 per cent., while in ankylostomiasis, kala-azar, and rats with trypanosomes and spirochætæ they were detected very frequently. We inferred that an excessive percentage of corpuscles with the granulation was indicative of the discharge of the red corpuscles into the blood stream at an earlier stage in their development than usual, due probably to processes of blood destruction and regeneration which, so far as we know, cannot be estimated by other methods. We now write to call the attention of clinicians more pointedly to the phenomenon in the hope that a study of it in many diseases will prove useful for diagnosis and treatment.

Probably the simplest method for demonstrating the granulation is the glass-rod method of liquid staining described by one of us hereafter. A polychrome saturated solution of methylene blue in 0·5 per cent. salt solution should be used. In about a quarter or half of an hour many of the red corpuscles are found to contain minute blue points, often lying in strings, either few in number or so numerous as to fill a large part of the corpuscle. The granules look like small particles of stain adhering to the surface of the corpuscle; but, of course, are not really of this nature. True nucleated red corpuscles can be easily distinguished by the fact that the nuclear membrane is still intact.

To estimate the percentage of granular red corpuscles as quickly as possible the following procedure is the best. The whole area of the field should not be examined, but the corpuscles should be passed rapidly in review one by one across the centre of the field and be counted as they pass, and as each granular corpuscle comes up an assistant should score a mark on a piece of paper. In this way nearly a hundred corpuscles may be scrutinised by the minute. In order to avoid serious error of "random sampling" at least a thousand corpuscles should be examined; but if the percentage of granular corpuscles is over 5 of this first thousand corpuscles we should examine another thousand, or if it is over 10, 15, &c., we should examine another two or three thousand, &c.

Many of the granular corpuscles, when stained with polychrome methylene blue, will often be found to contain after half an hour, in addition to the blue granules, one or more large deep crimson dots. These are the centrosomes of the original cell, as shown in our paper already referred to. It is possible that an estimate of the percentage of granular corpuscles which contain them will also prove to be of assistance in diagnosis. Nissle has independently just called attention to what appear to be the same bodies but does not give drawings.[3]

*Some Simple Methods for Staining Liquid Blood*, by Professor RONALD ROSS.—The staining of dried films is now being abandoned more and more for cytological work, and it may therefore be worth while to describe briefly some methods for making sufficiently thin stained films of liquid blood. Several such are given in text-books of hæmatology. One of the oldest, which was suggested by Soulié in 1890,[4] but was probably known long previously and has certainly been often re-discovered since, consists in spreading and drying a film of alcoholic solution of a stain on a glass slide and then placing over it the cover-glass charged with a droplet of blood. The elements soon take up the colour and beautiful preparations can be made, though there is often much granular matter and the blood does not always spread well.

1. *Glass-rod method.*—The plan of mixing the droplet of blood with aqueous solutions of stain in various ways has, of course, been largely used. The difficulty lies in getting a sufficiently thin film, because as a rule there is too much fluid in the mixture to allow of a single layer of corpuscles being obtained. After trying many methods I find the following one to be the simplest and best. A large drop of blood is taken up on a glass slide, and a drop of stain, not larger than the drop of blood, is quickly placed close beside it with the end of a glass rod. Then, with the other end of the rod the two drops are thoroughly mixed together, and small quantities of the mixture (say, of the size of a pin's head) are transplanted on to several other slides (just previously wiped clean from dust), where each is covered with a coverslip gently let down upon it. The smaller the droplet of mixture transplanted the thinner the resulting film, and the advantage of the use of the glass rod in this manner is that we can transplant droplets as small as we please and consequently obtain films of any tenuity we may wish for. Specimens for a considerable class may thus be made from a single drop of blood. Aqueous solutions of many stains may be employed and will not generally dissolve the red corpuscles if the amount of solution used is not in excess of the amount of blood.

One of the most useful stains is an old polychrome filtered saturated aqueous solution of methylene blue in 0·5 per cent. salt solution. Large areas, with separate corpuscles in single layer, yet not too much crushed, are obtained, just as in the best dried films. The leucocytes and blood plates are stained almost at once, although the background is almost colourless. A little later the red corpuscles take a blue tinge, and the chromolinin granules and centrosomes of a certain percentage of them[5] (which are not easily disclosed in dry stained films) begin to show up—the granules coloured blue and the centrosomes deep ruby red. The centrosomes of leucocytes are also coloured red; and it is important to note that the blood plates show similar minute red points, which, if they also are centrosomes, as is possible, will establish the long-contested cellular nature of these bodies. Trypanosomes can be well stained by several reagents. I am beginning to use this method generally in place of the ordinary unstained wet films.

2. *Agar method.*—Ordinary nutrient agar is melted and mixed with filtered saturated solutions of various stains (e.g., polychrome methylene blue) and poured on sloped glass slides, so as to obtain very thin films of the stained agar on the glass. The agar sets on the glass almost at once but does not dry until some time later. While its surface is still moist a coverslip charged with a droplet of blood is dropped upon it. The blood spreads out beautifully, the red corpuscles being generally disposed in a single layer of perfect discs. In a few minutes the elements take up the stain by adsorption from the stained agar, centrosomes and chromolinin granulation becoming apparent later. The picture is similar to that of Method I. but perhaps a little inferior, as the staining is not so vivid and the background is not so clear. Deetjen, so far as he can be understood, seems to have used this method but only partially in his study of blood plates[6]; but on the whole I do not think it is as good, even for this purpose, as Method I. The agar should be as deeply stained as possible, so as to stain the cells quickly; but the film of it on the glass should be as thin as possible, so as to allow sufficient light through it.

3. *Drained drop method.*—Thin liquid films are usually obtained by pressure between two surfaces of glass, but the following method gives a very thin liquid layer on a single surface. A coverslip is charged with a fairly large droplet of blood slightly spread out upon it and is then inverted on a shallow cell made with vaseline on a glass slide. This gives

[1] The two short articles which follow are records of work done at the Johnston Laboratories, University of Liverpool.
[2] Ross, Moore, and Walker: Transactions of the Pathological Society of London, vol. lviii., part 1, 1907.
[3] Nissle: Archiv für Hygiene, München, Band lxi.
[4] Soulié: Bulletin Médicale de l'Algérie, 1890, p. 230.
[5] Ross, Moore, and Walker: Transactions of the Pathological Society of London, vol. lviii., part 1, 1907.
[6] Deetjen: Archiv für Pathologische Anatomie und Physiologie, Band clxiv., p. 239, 1901.

a usual hanging-drop preparation; but the coverslip is now pressed down evenly and gently on the yielding vaseline until the lowest surface of the hanging drop touches the upper surface of the glass slide below it. There is thus formed a column of blood touching both the slide and the coverslip. Round this column on the under surface of the coverslip a clear zone of extreme tenuity and about a milligramme in breadth will be found. So shallow is the blood here that leucocytes and clusters of blood plates cannot get past it, while the red corpuscles can only squeeze through gradually. The cells are therefore spread out in this zone as perfectly as in any ordinary liquid or dry film, but only by adhesion to the glass, while, as the cell is air-tight, drying does not occur for hours. Moreover, the zone acts as a kind of filter for the leucocytes, which will be seen in hundreds adhering living to the glass and still kept moist with serum. For staining, the blood may be mixed beforehand with a solution of some stain, or, perhaps better, with a few small particles of the undissolved stain. Exquisite pictures of all the elements can thus be obtained without any flattening by pressure.

Specimens made by these methods are, of course, not permanent, as the elements soon break up. But by mixing the solution of stain used for Method I. with glycerine or Farrant's preservative the preparations will last in fair condition (enough, for example, to show the chromolinin granulation of the red corpuscles) for some months. For good permanent preparations, however, more complex methods must apparently be used, such as that of Walker, described in the paper already referred to.[7]

## A CASE OF CEREBRO-SPINAL MENINGITIS; ISOLATION OF THE SPECIFIC ORGANISM; PREPARATION OF A VACCINE; RECOVERY.

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THE patient, a male child, aged six months, was admitted to the City Hospital, Fazakerley, Liverpool, on Feb. 27th, 1907, certified to be suffering from cerebro-spinal fever. The diagnosis having been verified a vaccine treatment was decided upon, with results which seem sufficiently noteworthy to justify a report upon the clinical manifestations and course of treatment.

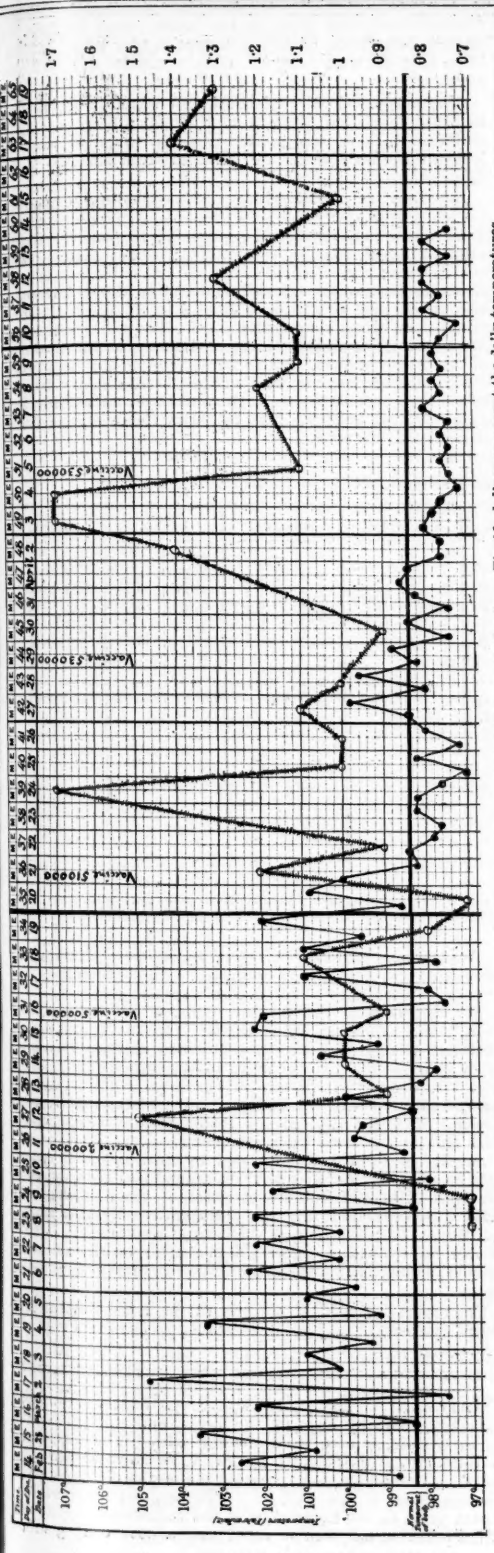
*History of onset.*—The child is stated to have been taken suddenly ill a fortnight before admission to hospital with vomiting and convulsions. Retraction of the head and neck was observed four days subsequently and squint within a week. Emaciation had been sufficiently marked to attract the attention of the mother within ten days of onset.

*Condition on admission.*—The general nutrition was fair, but loose folds of skin about the arms and thighs pointed to some recent wasting. The skin was pale and dry, presenting no rash. Beyond a few scattered râles no physical signs of disease were observed in the lungs; respiration was normal in character and frequency. The pulse was of fair tension, regular, and of normal frequency. Vomiting, a marked feature of the initial illness, had ceased; nourishment was taken readily and without difficulty. The general appearance and attitude of the child pointed to a profound disturbance of the nervous system. He lay on his side with his elbows and knees flexed, screamed shrilly at intervals, whilst his expression bore evidence of recurrent attacks of pain. The motor symptoms were definite and characteristic. The head was slightly extended on the spine and attempts to flex it were firmly resisted. The cervical and dorsal spines were fixed rigidly in orthotonos. The erector muscles of the spine were contracted and prominent with disappearance of the spinous processes between them. There was no trismus. The upper extremities were flexed at the elbows and the knees were drawn up upon the abdomen. These rigidities were tonic and not the result of an involuntary effort to resist movement. No clonic spasms or convulsions were observed. Double internal strabismus was marked and constant. Deglutition was unaffected. The age of the child precluded an accurate record of sensory impressions. Hyperæsthesia of the joints and skin was very marked. A light touch on the skin of the abdomen was sufficient to produce a scream of pain. No areas of anæsthesia were observed. There was no intolerance of ordinary daylight but the electric light called forth an immediate expression of pain. Similarly, although ordinary sounds produced little effect, loud noises, such as a clapping of the hands, caused obvious distress. No marked changes in the superficial or deep reflexes were observed. Kernig's sign was present but Babinski's sign was absent. The knee-jerks were slightly exaggerated. From the time of admission to the commencement of the vaccine treatment on March 11th the condition of the child became progressively worse. The general nutrition failed rapidly until no subcutaneous fat could be detected on pinching the skin. Spasm of the muscles of deglutition was induced by each attempt to swallow and the extreme retraction of the head and neck appeared to offer a physical obstruction to the passage of food. The contraction of the erector muscles of the spine produced a complete tetanoid opisthotonos. The elbows, hips, knees, and ankles became rigidly flexed, and the eyes fixed and staring. The pupils remained equal and active throughout. No paralyses or areas of anæsthesia were observed. Variations in the quality and timing of the pulse occurred, but retardation was never a marked feature. From March 9th to 11th vomiting recurred repeatedly and rectal feeding was resorted to. During this period the presence of the diplococcus intracellularis meningitidis had been detected in the cerebro-spinal fluid repeatedly, but lumbar puncture produced no alleviation of the irritative phenomena.

The first vaccine inoculation was made on March 11th. With the exception of a remission in the temperature of the body no marked change was observed in the clinical manifestations during the succeeding 48 hours. On the 14th, however, a definite decrease in the degree of extension of the head and neck was noted, the spine could be straightened with the exercise of moderate force, and lateral movements of the head were made voluntarily. On the evening of the 14th an exacerbation of the pyrexia occurred, not accompanied by an aggravation of the irritative phenomena. A second inoculation was made on the 16th followed by a period of apyrexia lasting 24 hours. On the 17th the eyeballs were observed to be fixed less rigidly, some lateral movements occurred voluntarily. The improved position of the head and neck at this period made feeding by the mouth again possible. Vomiting ceased entirely. Hyperæsthesia and Kernig's sign persisted. During the period from the 17th to the 21st the temperature was raised and irregular; a third inoculation was made on the latter date, followed, as were the previous inoculations, by a period of apyrexia persisting on this occasion six days. The squint was now occasional only, the position of the head and neck approaching the normal, and the flexion of the joints of the extremities was easily overcome. A moderate degree of pyrexia from the 27th to the 29th was met by a further dose of vaccine on the latter day. The temperature subsequently remained normal until the end of treatment. Kernig's sign was first noted as absent on April 2nd. From this date to the conclusion of treatment a rapid and progressive improvement in the condition of the child was maintained. The irritative phenomena and hyperæsthesia disappeared. The appetite and state of nutrition became normal. No affection of the special senses persists.

Our investigations into the efficacy of vaccine treatment in this disease have been restricted by the freedom of the city of Liverpool from cerebro-spinal fever in epidemic form, but there are, we think, some encouraging features in the history of this case and its treatment. The patient came under treatment at a time when his condition justified a most unfavourable prognosis. The extreme and progressive retraction of the head and neck, accompanied by other advanced nervous phenomena, the return of the vomiting (a most grave symptom), and the rapid emaciation pointed to the probability of a fatal termination. The apyrexia following the first injection of vaccine recurred after subsequent injections. So rapid and complete a recovery with no definite relapses or involvement of the special senses could, we think, scarcely have been expected with the customary methods of treatment at our disposal.

[7] Loc. cit.




The dotted line represents the curve of the opsonic index. The figures on the right give its numerical value. The black lines represent the daily temperatures.

*Preparation of vaccine.*—A 24-hours old culture was inoculated into sterile normal saline solution and placed in a water bath at 60° C. for half an hour; nasgar tubes were inoculated from it and incubated overnight to test sterility. The number of cocci contained was estimated by mixing known volumes of washed normal blood and vaccine; these were then diluted with normal saline solution, films prepared at once and stained by Leishman's method. The number of organisms present was counted against the red blood corpuscles. The vaccine was freshly prepared for each of the first four doses; the fifth had been made seven days before use. No local reaction was observed after any of the injections.

*Opsonic index.*—Equal parts of leucocytes, emulsion (24-hours old culture in 0·1 per cent. NaCl), and serum were mixed together and incubated at 37° C. for ten minutes; we found that 15 minutes made the count extremely difficult to perform from excessive vacuolation and rapid degeneration of the cocci. The smears were stained by Leishman's method; at least 200 leucocytes were counted. The changes in the index and temperature are best seen by observation of the chart. The first inoculation (200,000) was made on March 11th, the index having been then 0·7 on two consecutive days; on the 12th it rose to 1·5 but fell again to 0·9 and 1 on the 13th, 14th, 15th, and 16th. As this dose had produced no harmful effects but had been followed by temporary alleviation we repeated it (500,000) on the 16th. A small rise in the index was observed on the 18th; on the 19th and 20th a fall was recorded, but on the 21st the index had risen to 1·2. A further dose (510,000) was given and a slight fall on the 22nd was followed by an abrupt rise on the 23rd. Within 48 hours the index had again dropped markedly. The events following the first inoculation had repeated themselves. As the index remained comparatively low on the 25th, 26th, 27th, and 28th, with a slight tendency to rise of temperature on the two last days, a fresh dose (530,000) was given on the 29th. The index fell slightly, followed by a rise which was well maintained until April 4th. On the 5th the index had dropped to 1·1. What proved to be the last inoculation was made on this day. A slight rise was noted on the 8th. The subsequent indices are recorded on alternate days. Since the inoculations were on each occasion followed by a rise in the index, and on three occasions by a rise of so marked a character, it seems reasonable to suppose that there is a connexion between the two events.

*Agglutination.*—These experiments were performed within five hours of the removal of the blood, by the platinum loop method, microscopic examination, laboratory temperature (12°–15° C.) except on one occasion mentioned in the text. The organisms were obtained from 24 hours old "nasgar" cultures emulsified in 0·1 per cent. salt solution. Controls were invariably negative. Five sets of experiments were performed.

*A.*—To test the agglutination of normal serum on the Liverpool coccus. This was done on six occasions; once a 1 in 5 dilution agglutinated in ten minutes; subsequent experiments failed to repeat this. Higher dilutions were invariably negative; time, one hour.

*B.*—To test the agglutination of the Liverpool coccus by the patient's serum. The table given below shows that during the period of the observations the agglutination reaction was at a maximum from the fortieth to the fiftieth day of the disease, and from that date has shown a steady decline.

| Day of disease. | Dilutions. | | |
|---|---|---|---|
| | 1 in 50. | 1 in 100. | 1 in 500. |
| 36 | 15 mins. | — | — |
| 40 | 10 ,, | 25 mins. | 47 mins. |
| 50 | 12 ,, | 25 ,, | — |
| 58 | 34 ,, | 48 ,, | 64 mins. (incomplete) |
| 64 | 45 ,, | Neg. 60 ,, | — |
| 68 | 90 ,, (incomplete) | Neg. 90 ,, | Neg. 90 mins. |
| 72 | 87 mins. | Neg. 105 ,, | — |

Neg. = Negative.

*C.*—To test the agglutinating power on the Liverpool coccus of the sera of patients suffering from other diseases.

In this connexion one observation was made which is of interest in that it affects the specificity of the reaction. The blood of a patient suffering from scarlet fever (twenty-third day of disease, severe case, no complications) agglutinated the Liverpool strain in dilutions 1 in 20 (45 minutes); 1 in 50 (60 minutes); and 1 in 100 (neg., 75 minutes). Further investigations in this subject are being made.

*D.*—To test the identity of the Liverpool strain by comparing the effect of the patient's serum upon strains derived from other sources with its effect upon the Liverpool strain. For the cultures used we are indebted to Dr. Buchanan and Professor W. St. Clair Symmers.

| Day of disease. | Source of culture. | Dilutions. 1 in 50. | 1 in 100. | 1 in 500. |
|---|---|---|---|---|
| 43 | Belfast. | 20 mins. | 40 mins. | — |
| 50 | Glasgow. | 24 ,, | Neg. 60 ,, | — |
| 54 | Glasgow (C——). | 30 ,, | 50 ,, | Neg. 60 mins. |
| 58 | Glasgow (B——). | 32 ,, | 40 ,, | Neg. 60 ,, |
| 61 | Glasgow. | 27 ,, | Neg. 60 ,, | — |

Löffler's methylene blue, as the latter failed to stain the degenerated forms, of which, except in very young cultures, large numbers were present. Gram's method was invariably negative.

*Morphology.*—Cocci, diplococci, and tetrads; no tendency to chain formation even in fluid media; there was much variation in size, the greater breadth compared with the length was a marked feature. The adjacent surfaces of the diplococci were flattened.

*Reactions in carbohydrate media.*—Medium employed: Lemco, 1 gramme; peptone, 1 gramme; sodium-bicarbonate, 0·1 gramme; carbohydrate, 1 gramme; 10 per cent. watery solution litmus, 10 cubic centimetres; ascitic fluid, 10 cubic centimetres; and distilled water to 100 cubic centimetres. Boiled for 20 minutes, 10 cubic centimetres filtered into sterile test tubes, and sterilised in Koch's steam steriliser for 20 minutes on three consecutive days. The tubes were inoculated from 24-hours old "nasgar" cultures and incubated at 37° C. for seven days. Films were made at intervals to test for possible contamination; on the seventh day "nasgar" tubes were inoculated from the carbohydrate cultures and gave a typical growth. The following table represents the changes that occurred:—

TABLE SHOWING THE CULTURE REACTIONS OF THE MENINGOCOCCUS ON CARBOHYDRATE MEDIA.

| Origin of organism. | Maltose. | | Glucose. | | Galactose. | | Saccharose. | | Raffinose. | | Inulin. | | Salicin. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Commencement of reddening. | Maximum reddening. | Commencement of reddening. | Maximum reddening. | Commencement of reddening. | Maximum reddening. | Commencement of reddening. | Maximum reddening. | Commencement of reddening. | Maximum reddening. | Commencement of reddening. | Maximum reddening. | Commencement of reddening. | Maximum reddening. |
| | Third day. | Fifth day. | Second day. | Fifth day. | Fourth day. | Sixth day. | | | | | | | | |
| Liverpool ... ... ... ... | + | ++ | + | ++ | + | ++ | – | – | – | – | – | – | – | – |
| Glasgow ... ... ... ... | + | ++ | + | ++ | + | ++ | – | – | – | – | – | – | – | – |
| | | | | | Second day. | | | | | | | | | |
| Glasgow (Currie) ... ... | + | ++ | + | ++ | + | ++ | – | – | – | – | – | – | – | – |
| Glasgow (Brigga) ... ... | + | ++ | + | ++ | + | ++ | – | – | – | – | – | – | – | – |
| Belfast... ... ... ... ... | + | ++ | + | ++ | + | ++ | – | – | – | – | – | – | – | – |

+ Indicates the first day on which a change of colour was noticed; ++ indicates the maximum reaction (a distinct reddening); and – denotes absence of reaction.

The table shows that the serum of our patient agglutinated all the strains available in the same dilutions as the Liverpool strain.

*E.*—Experiments to test the power of the patient's serum upon other organisms; for these the typhoid bacillus, bacillus coli, pneumococcus, and a streptococcus derived from a human throat were used. The typhoid bacillus, bacillus coli, and pneumococcus showed no agglutination even in dilutions of 1 in 10 (time, one hour). The streptococcus showed no agglutination in 23 hours incubated at 32° C.; dilution 1 in 10.

These experiments show that the agglutination reaction is not strictly specific, since both normal serum and the serum of a patient suffering from another disease produced it.

*Identification of organism.*—The cerebro-spinal fluid was obtained on March 1st (sixteenth day of the disease); films were stained but we were unable to satisfy ourselves of the presence of a bacterium. Tubes of Löffler's blood serum and ascitic fluid broth (1 : 2) were inoculated and incubated at 37° C. On the following day a pure growth of a coccus was observed on the blood serum tubes and occasional large cocci were found in the ascitic fluid broth; sub-cultures were made on human blood agar, Löffler's blood serum, and nasgar. In the early stages Löffler's blood serum gave the best results; it is of importance that it should not be overheated or dry.

*Appearance of 24-hours old "nasgar" growth.*—Smooth, greyish-white, moist-looking. On attempting to remove some of the culture with platinum needle distinct "stickiness" is noted.

*Staining reaction.*—The coccus stained with the usual aniline dyes; weak carbol-fuchsin gave better results than

Anaerobic cultures on "nasgar" by the pyrogallic method incubated at 37° C. were negative. Aerobic cultures on "nasgar" incubated at 20° C. also were negative.

We believe that the clinical features of the case, the morphology, the staining reactions, and the agglutination reactions compared with those obtained with meningococci from other sources, the changes in the carbohydrate media, and the absence of growth in anaerobic cultures and in aerobic cultures at 20° C. justify us in presuming that we were dealing with the diplococcus intracellularis meningitidis. The animal reactions were not successful. A 24 hours old "nasgar" culture was inoculated by intravenous injection into a rabbit on March 16th; the animal was alive and well on April 24th. 0·5 cubic centimetre of the cerebro-spinal fluid was inoculated into the peritoneal cavity of a mouse on March 1st; the animal died three days later. It had shown no symptoms before death; after death we were unable to demonstrate the coccus either in films or by growth on media.

The report of Dr. M. H. Gordon to the Local Government Board has been of very great assistance to us in this work.

Liverpool.

LITERARY INTELLIGENCE. — Messrs. W. B. Saunders Company have in the press, and will publish at an early date, a new work dealing with "The Pancreas, its Surgery and Pathology," by Mr. A. W. Mayo Robson and Dr. P. J. Cammidge, incorporating the results of the original investigations of the authors. The progress made within recent years in the knowledge of the functions and diseases of the pancreas has been so rapid that a book dealing with this important organ will be welcome.

# A STUDY OF THE CONDITIONS PRODUCING THE ANOMALOUS REACTION NOT INFREQUENTLY MET WITH ON TESTING URINE FOR SUGAR WITH FEHLING'S SOLUTION.

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IT falls within common knowledge that on testing urine for sugar with Fehling's solution a reaction may be obtained which is so at variance with what is ordinarily met with as to give rise to no inconsiderable embarrassment. The anomalous reaction to which I am alluding has recently formed the subject of consideration in a communication on "The Detection of Sugar in Urine, &c.," by Dr. A. M. Kellas and Dr. F. J. Wethered to be found at pages 1058 and 1136 of the second volume of THE LANCET for 1906, and in an article entitled "Observations on Fehling's Test for Dextrose in Urine," by Dr. Hugh MacLean published in the *Bio-Chemical Journal*, vol. i., p. 111, 1906. Through these communications I have been prompted to conduct the inquiry which has resulted in the information being obtained which I propose herein to set forth. In view of my long association with the operation of testing for sugar the undertaking has afforded congenial work. In addition, I may say that I have been impressed with the feeling, on looking at the value of Fehling's solution as a urinary test and the extensive employment it commands, that it might well be considered worthy of the bestowal of efforts to clear up an anomalous behaviour that is not infrequently observed to follow its application to certain kinds of urine.

The point to be determined is what stands at the foundation of the varieties of anomalous behaviour of the test that are observed. The essential action which in all circumstances takes place is a reduction of the cupric oxide to the state of suboxide. Under what may be spoken of as the normal reaction, or that occurring when the test liquid is boiled with an aqueous solution of glucose, the suboxide formed presents itself immediately to view as a dense vermilion-red precipitate, which more or less quickly settles out of the liquid. However small the quantity of sugar the precipitate falls in the form mentioned when extraneous matter is absent and a sufficient quantity of Fehling's solution is employed. In the case of urine, when large quantities of sugar are present, a precipitate is immediately produced, but the colour of it is different, being observed to range from yellow to brownish red. In the presence, on the other hand, of small quantities, a wide difference is noticeable in the character of the result occurring. At first no precipitate may be produced and none even may show itself till after somewhat prolonged boiling or it may be none may appear till after the test tube has stood in the rack for a little time. The precipitate in these circumstances possesses a yellow colour which it retains without passing into the pronounced red, as happens in the case of the application of the test to urine containing a large quantity of sugar. It sometimes happens that a change of colour occurs without any definite settlement of precipitate. With this change the liquid assumes an opalescent or milky character and may be found in this state on the following day, the colour being either yellow, yellowish green, or another shade of green, according to the preponderance of yellow from reduced oxide or of blue from the unreduced test solution.

To what are all these points of variation attributable? Chemists tell us that, as with the cupric oxide, the cuprous oxide presents itself in the hydrated and the non-hydrated form, the former being stated to be represented by the yellow and the latter by the red product. The shades of colour from yellow to red that may happen to be observed are assigned to transition from the hydrated into the dehydrated state. It may be said to be in harmony with what might be expected under the view specified that the process of boiling should promote the occurrence of dehydration, and it is noticeable that it tends to promote the passage of a yellow into a red precipitate. In the case, for example, of a cuprous salt it is open to observation that the bright yellow precipitate which falls on the careful addition of a caustic alkali passes on subjection to ebullition into a red or brownish-red; and the phenomenon is attributed by chemists to the occurrence of dehydration. I shall show later that the alteration of colour is associated with an altered physical state rendered evident by the microscope.

At variance with the ordinary reaction attended with the production of a more or less copious precipitate, a reaction, as mentioned, may present itself in which there is a change of colour to different shades of green or even to yellow without any actually visible precipitate at the time of applying the test and perhaps the contents of the test-tube may even be found to have retained their opalescent or milky state on being looked at on the following day. To this form of reaction, so widely differing in character from the ordinary effect of sugar, I will proceed to give attention with the view, on the one hand, of ascertaining its meaning and, on the other, of unravelling the conditions leading up to its production. It may be taken as obvious that some definite operative agency must exist and this ought to be susceptible of disclosure.

There are other reducing bodies besides sugar in the urine—uric acid and creatinine may be specially named; and the question has been raised by some as to whether the anomalous reaction under consideration may not be due to the mode of reduction effected by one or other of these. The authorities to whose communications I have referred express the opinion that creatinine, by virtue of its presence as such, constitutes the source of the modified result, Dr. MacLean (*loc. cit.*, p. 116) particularising and stating that, "with regard to its power of masking the presence of small amounts of sugar, it is probable that the cuprous hydrate or oxide is held in solution by kreatinin."

The subject before us may be said to be one that has received considerable attention, but at the same time it may be considered that it has not been as yet exhaustively dealt with. From the nature of its surroundings it stands on very fitting ground for subjection to chemical investigation, and I have found that invaluable aid is afforded by the microscope in helping to unravel the intricacies embodied in it. Let us see what is learnt by a joint appeal to these two modes of investigation. Some years ago I gave consideration to the matter and expressed the view I had been led to entertain upon it. I will not at this stage say anything about this view, but will defer speaking of it until after the evidence obtained from the further inquiry that has been conducted has been set forth, so that the information thus supplied may be brought into use in dealing with the elucidation of the problem.

I will, in the first place, show what is attainable with the employment simply of Fehling's solution and a solution of dextrose. The formula of Fehling's solution differs to some extent as given by different authorities. The liquid which I have been in the habit of employing from a very early period contains potash instead of soda, and the amount of alkali is somewhat larger than that given in other formulæ for the test. The modification has appeared to me to yield a more stable and reliable test and for this reason I have adhered to it from the beginning. For the observations, however, recounted in this communication I have throughout adopted, as most in harmony with what is generally employed, the formula given by Allen in his work on the "Chemistry of the Urine" (Churchill, 1895), p. 59.

Taking two cubic centimetres of Fehling's solution and boiling it, as is done in the ordinary mode of applying the test to urines, with an equal quantity of a 1 per cent. solution of dextrose, the effect observed is the production of a vermilion-red precipitate of cuprous oxide of a sufficiently dense nature to be not long in settling to the bottom of the tube. In the presence of a larger amount of dextrose—an amount that is more than sufficient for the reduction of the cupric oxide contained in the quantity of the test liquid employed—the colour soon changes to a dark brown or even a brownish black, a result (often noticeable in testing strongly saccharine urine) which is considered to be due to the action of the caustic alkali on the dextrose standing in excess.

If now, instead of taking equal quantities of the two solutions, the dextrose be diminished by adding five drops only of its solution to the two cubic centimetres of Fehling's solution, the character of the precipitate produced on boiling is found to remain unaltered, but of course the amount of it is less. With one drop, even, a like result is observed, and indeed, however small the amount of sugar added, whatever precipitate is formed when the method of procedure under consideration is followed, shows itself on settling in the form of the deep red cuprous oxide. Whilst

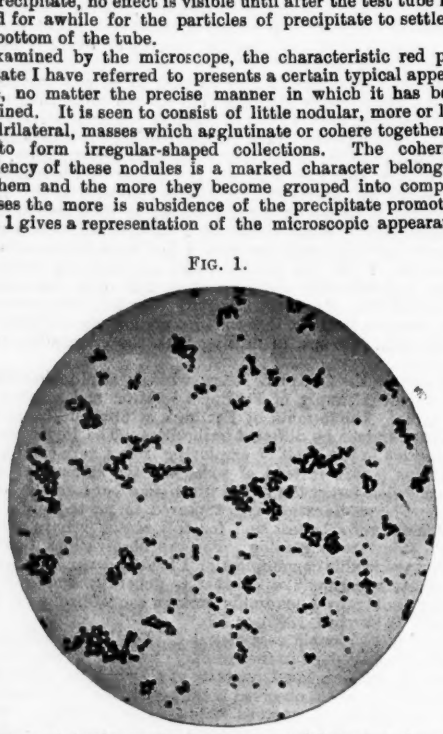
the precipitate is suspended in the liquid a sort of shot-silk appearance is produced from the admixture of red and blue, the precise character of the appearance varying according as the precipitate or the unchanged liquid preponderates, and likewise according to the position of the light by which it is viewed.

There is a point connected with the mode of applying heat to the test-tube that is worthy, I consider, of a passing comment. When the tube is heated in the usual manner from the bottom the normal coloured precipitate shows itself, whilst if heated by applying the flame to the top of the liquid and allowing the heat to travel down, the tube being held slantingly for the purpose, an ochry red precipitate is produced instead of the characteristic red otherwise obtained. The difference in the result produced by the two methods of heating is very striking and is found to apply to other instances where limited quantities of sugar are being dealt with.

I have spoken of the results noticeable after diminishing the sugar by a reduction of the amount of the solution employed, and it has to be said that no difference follows the diminution by the employment of more dilute solutions. The same character of precipitate is produced from the employment of a 1 per 1000 as from a 1 per cent. solution of dextrose. The same even is the case with a 1 per 10,000 solution, but here, on account of the smallness of the amount of precipitate, no effect is visible until after the test tube has stood for awhile for the particles of precipitate to settle to the bottom of the tube.

Examined by the microscope, the characteristic red precipitate I have referred to presents a certain typical appearance, no matter the precise manner in which it has been obtained. It is seen to consist of little nodular, more or less quadrilateral, masses which agglutinate or cohere together so as to form irregular-shaped collections. The cohering tendency of these nodules is a marked character belonging to them and the more they become grouped into compact masses the more is subsidence of the precipitate promoted. Fig. 1 gives a representation of the microscopic appearance

FIG. 1.



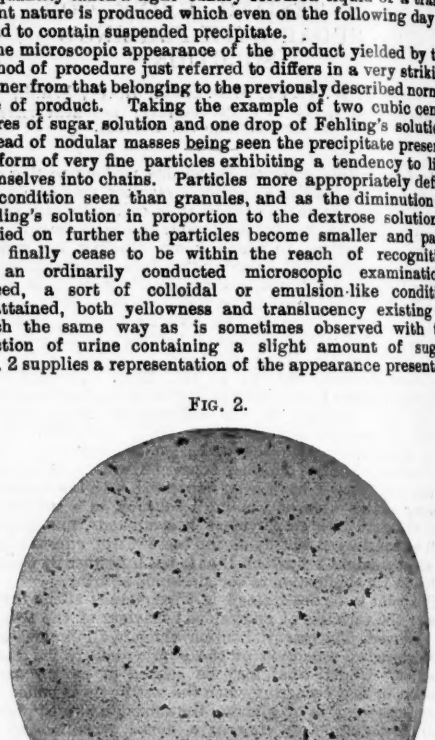
From photomicrograph of suboxide precipitate from two cubic centimetres of 3 per 1000 solution of dextrose and two cubic centimetres of Fehling's solution. Magnified 440 diameters.

of the precipitate under consideration and it may be remarked with regard to it that in the preparation of the slide a detachment of nodules occurs and renders the grouping less conspicuous.

If a reversal of the mode of procedure with a minimum quantity of sugar added to Fehling's solution be adopted and the 1 per cent. dextrose solution be placed in the tube and a minimum quantity of Fehling's solution be added an altogether different result is obtained. If, for instance, two cubic centimetres of a 1 per cent. solution of dextrose are placed in the tube and one drop of Fehling's solution added the effect on boiling is the production of a bright yellow precipitate which takes some hours thoroughly to settle out. If a relatively smaller quantity of Fehling's solution be used, as, for example, if four cubic centimetres of dextrose solution be treated with one drop of Fehling's solution, a paler yellow product presents itself with still less disposition to yield a settlement, and if eight cubic centimetres instead be the quantity taken a light canary-coloured liquid of a translucent nature is produced which even on the following day is found to contain suspended precipitate.

The microscopic appearance of the product yielded by the method of procedure just referred to differs in a very striking manner from that belonging to the previously described normal type of product. Taking the example of two cubic centimetres of sugar solution and one drop of Fehling's solution, instead of nodular masses being seen the precipitate presents the form of very fine particles exhibiting a tendency to link themselves into chains. Particles more appropriately define the condition seen than granules, and as the diminution of Fehling's solution in proportion to the dextrose solution is carried on further the particles become smaller and paler and finally cease to be within the reach of recognition by an ordinarily conducted microscopic examination; indeed, a sort of colloidal or emulsion-like condition is attained, both yellowness and translucency existing in much the same way as is sometimes observed with the reaction of urine containing a slight amount of sugar. Fig. 2 supplies a representation of the appearance presented.

FIG. 2.



From photomicrograph of suboxide precipitate from two cubic centimetres of 1 per cent. solution of dextrose and one drop of Fehling's solution. Magnified 440 diameters.

Increasing the strength of the dextrose solution has an effect that would hardly be likely to be predicted. With two cubic centimetres of a 25 per cent. solution of dextrose and one drop of Fehling's solution the precipitate produced on boiling is of a pale yellow, translucent, flocculent nature, presenting under the microscope the appearance of pellucid, spread-out plaques. With a 50 per cent. solution the result is attended with a greater appearance, both macroscopically and microscopically, of translucency.

It is thus seen that without bringing into the question the influence of any extraneous agency we can determine at will the production of modifications in the behaviour of sugar with Fehling's test resembling modifications that may be come across in the application of the test to urine containing a slightly abnormal amount of sugar. It is true the modification follows a method of applying the test different from that ordinarily adopted, but through the information obtainable by the aid of the microscope light is thrown upon the underlying condition existing which helps to give a clue to the solution of the problem before us.

### MODIFYING INFLUENCE OF AMMONIA.

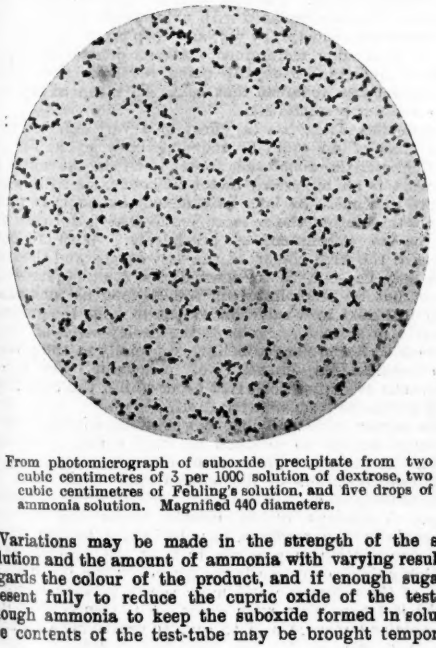
I will now deal with the modifying effect that is exerted on the action of the test when ammonia is present. The object in hand is to lead on to an explanation of the anomalous results that may happen to be observed in connexion with urine testing, and free ammonia is found to be developed as an attendant phenomenon of the proceeding.

It is well known that ammonia is a potent solvent of

cuprous oxide. The solution constitutes a clear, colourless, watery liquid. Owing to the solvent power mentioned when reduction of the cupric oxide contained in the cupric test solution is effected in the presence of ammonia, the result is the loss of the blue colour derivable from the cupric oxide, and the production of a perfectly colourless, watery liquid. Reduction is in no way interfered with, but the reduced oxide fails to make itself visible. The action occurring is turned to account for quantitative sugar determination in the application of the ammoniated cupric liquid which bears my name. If the ammonia be driven off by means of heat the cuprous oxide previously held in solution becomes precipitated, but, as the forthcoming evidence will show, it falls in a state somewhat modified from that presented under precipitation in the ordinary way.

To illustrate the effect of the presence of ammonia a 3 per 1000 strength of dextrose solution is a convenient one for employment. It is requisite that there should not be sufficient sugar to stand in excess of the cupric oxide to be reduced in the test solution employed. Two cubic centimetres of the 3 per 1000 dextrose solution do not fully reduce the cupric oxide in two cubic centimetres of Fehling's solution and therefore a certain amount of the test liquid remains unchanged. The precipitate produced on boiling the proportions named of the two liquids by themselves consists, as may be inferred, of the normal red cuprous oxide. This is seen to be dispersed through the liquid and afterwards to settle as a compact red deposit in the ordinary way. Examined microscopically it is found to present the usual nodular condition with the nodules cohering into irregular-shaped masses. If to a corresponding admixture of test and dextrose solutions five drops of strong solution of ammonia (specific gravity 0·880) be added, considerable boiling is required before any notable reaction is seen to occur. The first effect noticeable is that the intensity of the blue becomes somewhat diminished as a consequence of the reduction without precipitation that takes place. Then, as the ammonia is driven off, the contents of the tube may become suddenly opaque and in the first instance of a dirty green colour, which quickly runs into dirty yellow and afterwards brownish with a certain amount of reddish tint. The precipitate to the naked eye presents a very different appearance from that of the precipitate belonging to the normal reaction, and microscopically it is seen to consist of conspicuously finer particles with seemingly a less strong cohesive tendency. A representation of the character of the precipitate is given in Fig. 3.

FIG. 3.



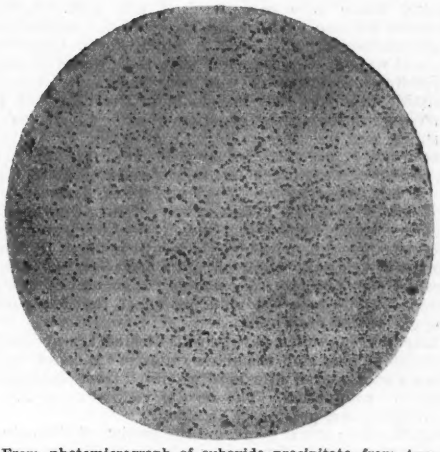
From photomicrograph of suboxide precipitate from two cubic centimetres of 3 per 1000 solution of dextrose, two cubic centimetres of Fehling's solution, and five drops of ammonia solution. Magnified 440 diameters.

Variations may be made in the strength of the sugar solution and the amount of ammonia with varying results as regards the colour of the product, and if enough sugar be present fully to reduce the cupric oxide of the test and enough ammonia to keep the suboxide formed in solution, the contents of the test-tube may be brought temporarily to a clear, colourless state, which with a further expulsion of ammonia suddenly changes and gives place to the presence of the suboxide in a precipitated form.

An instructive result is obtained by adding a little albumin to the admixture of Fehling's solution, sugar, and ammonia. Albumin has no reducing power in itself, and in small quantity (in large quantity it interferes with precipitation apparently through the extent of concurrent generation and evolution of ammonia occurring) exerts no influence on the character of the cuprous oxide precipitate produced. It is the normal red precipitate that falls in the presence of the albumin, just as happens without it, and microscopically the conditions in the two cases are practically alike. If, however, the ammonia and albumin are conjoined an effect is produced identical with what is noticed on applying the test to urine containing a slightly abnormal amount of sugar.

Taking two cubic centimetres of Fehling's solution, two cubic centimetres of a 1 per 1000 solution of dextrose, five drops of ammonia solution, and five drops of a 2 per cent. solution of dried egg albumin, and boiling in the usual way, the following is the result observed. Quite prolonged boiling is required before any change is perceived. Then the contents of the tube become milky and dark green, and, as boiling is carried on, the green passes into a lighter shade with a yellow tint. The condition agrees with what would

FIG. 4.



From photomicrograph of suboxide precipitate from two cubic centimetres of 2 per 1000 solution of dextrose, two cubic centimetres of Fehling's solution, five drops of ammonia solution, and five drops of a 2 per cent. solution of dried egg albumin. Magnified 440 diameters.

be suggestive, if urine were being examined, of the presence of a slightly abnormal amount of sugar. By increasing the strength of the sugar solution to 2 per 1000 the reaction is of the same character, but more marked in degree. The microscopic appearance presented is totally different from that observed in ordinary circumstances and perfectly in accord with that belonging to urine exhibiting a similar kind of behaviour with Fehling's test. The field is studded over with exceedingly minute separated particles, so minute in the case of the 1 per 1000 strength of sugar solution as to require close attention to be given to see them. With a stronger solution they are more distinctly visible, but are still seen to be scattered in a more or less completely isolated state. The microscopic appearance fully accounts for the emulsion-like character belonging to the product. Fig. 4 gives a representation of the condition that has been described.

### INFLUENCE OF URIC ACID.

I will now pass to the consideration of the part played by the cupric oxide reducing agents that are present in the urine in addition to sugar. The only agents of sufficient significance to call for attention are uric acid and creatinine. Let us see in what position these agents stand in relation to the matter that is under consideration, first dealing with uric acid.

Observation shows that uric acid behaves in a corresponding way to sugar in its reducing action upon Fehling's solution. The precipitate that falls consists of the red

cuprous oxide, which coincides in microscopic appearance with the analogous precipitate produced by pure solutions of sugar. Weak potash solution may be used to dissolve the uric acid and a 3 per 1000 strength of the acid is a convenient one to employ to show its behaviour; but it should be understood that the reaction produced is not a large one. If too much uric acid is present a white precipitate falls which interferes with the occurrence of reduction. The same effects follow in the case of uric acid as a result of the presence of ammonia, albumin, and albumin and ammonia conjoined, as was mentioned to occur in the case of sugar. Particularising for the last, two cubic centimetres of 3 per 1000 uric acid, two cubic centimetres of Fehling's solution, five drops of 2 per cent. albumin solution, and five drops of ammonia give, after the very prolonged boiling required to get rid of the ammonia, the milky-green and greenish-yellow reaction that is often met with in testing urine.

The cupric oxide reducing power of uric acid is considerably less, reckoning weight for weight, than that of sugar. It is easy of determination by means of the ammoniated cupric (Pavy's) test. I some time ago suggested the employment of this test for the quantitative estimation of uric acid in urine. The subject was brought forward in a communication to the Royal Medical and Chirurgical Society and the communication was published in Vol. LXIII. of the Society's Transactions. The process consists of taking the reducing power of the urine before and after treatment with lead acetate, which is a precipitant of uric acid. From the difference the uric acid is calculated and the several results of actual observations given, in which known quantities of uric acid were dealt with, show that the process is capable of yielding estimations of very close accuracy. It must be admitted, however, that it is only in the hands of those possessing considerable experience and expertness that reliability can be expected to be attainable.

The actual cupric oxide reducing power of uric acid in relation to that of dextrose is less to the extent that 18·6 parts of uric acid stand as the co-equal of 10 of dextrose. This is deducible from the fact that whilst 10 milligrammes of dextrose constitute the reducing equivalent of 20 cubic centimetres of the ammoniated cupric test, it requires 18·6 milligrammes of uric acid to bring about a corresponding reducing effect. Hence not far from double the amount of uric acid is needed to produce the reducing effect that is capable of being exerted by dextrose.

I may mention that I have recently tested the accuracy of the results upon which the above statement is based by subjecting a specimen of uric acid procured from Kahlbaum of Berlin to examination. The results yielded stood in close accord with those previously obtained.

With the data at our command the portion of the reducing power of a specimen of normal urine which is to be ascribed to uric acid can be expressed in terms which may be considered to fall within a close reach of accuracy. Although it may not be indicated by Fehling's solution, urine, nevertheless, has always a certain measurable amount of cupric oxide reducing power, which, it may be said, is considerably greater than it is generally thought to be. This reducing power is readily susceptible of recognition and quantitative estimation by the ammoniated cupric test and in my recent work on "Carbohydrate Metabolism and Diabetes" I have given the results of numerous determinations of its amount in the urines of various animals, including man. Figures are given representing the condition found in 12 specimens of normal urine from the human subject. The highest of these stands at 4·88 per 1000 expressed as dextrose, and the lowest at 0·91, the mean of the 12 being 2·79. It may be remarked in passing that the amount found is largely dependent upon the degree of concentration of the urine under examination.

Taking the above mean figures we have 2·79 per 1000 standing as the average representative of the cupric oxide reducing power expressed as dextrose of the specimens of urine in question. What portion of this is due to uric acid? Let us see how the calculation works out under the following mode of dealing with the matter. It is ordinarily reckoned that about one gramme constitutes the quantity of uric acid and about 1500 cubic centimetres the quantity of urine eliminated per diem. One gramme in 1500 cubic centimetres gives 0·66 gramme as the proportionate amount in 1000 cubic centimetres. Of the total reducing action, consisting of 2·79 per 1000 expressed as dextrose, a portion is due not to dextrose, but to the 0·66 per 1000 of uric acid that is present. It has been shown above that 18·6 parts of uric acid correspond in reducing power with 10 parts of dextrose. From this relation the 0·66 gramme of uric acid will have a reducing power expressed as dextrose of $\frac{0{\cdot}66 \times 10}{18{\cdot}6} = 0{\cdot}35$, which brings the issue to 0·35 part of the reducing power out of the 2·79 being due to uric acid. Otherwise expressed, about one-eighth of the reducing action of normal urine upon the basis formulated is attributable to the uric acid present.

I have spoken of the cupric oxide reducing power possessed by uric acid and it is only this that brings uric acid into relation with the subject under consideration. It has no influence on the reaction producible by sugar.

### INFLUENCE OF CREATININE.

The action of creatinine in its reducing effect on Fehling's solution is not of the simple nature of the ordinary reducing bodies. It may be said at once that a complicated result is produced through its influence on the character of the precipitation and the generation and evolution of ammonia which, to a pronounced extent, takes place as an accompanying event. My observations have been conducted upon a specimen obtained from Merck of Darmstadt, a source which I think may be considered to justify confidence with respect to purity.

In the first place two cubic centimetres of a 0·5 per cent. creatinine solution (= ten milligrammes creatinine) were boiled and kept boiling, with careful agitation of the test tube to prevent ejection of its contents, with an equal quantity of Fehling's solution. The result was attended with the following succession of events. Ammonia in notable quantity began almost immediately to be evolved, as shown by litmus paper, corroborated by paper soaked in Nessler's mercuric iodide solution, introduced into the mouth of the test-tube, and was still being evolved when the boiling was stopped at the end of ten minutes. The blue colour first to some extent faded and then acquired a greenish tint, the liquid remaining bright and clear. Not till the boiling had been carried on for nine minutes was any turbidity perceptible, and then the contents of the tube became opaque and of a dirty green colour which afterwards passed into a yellowish green. After having stood for some time some yellow precipitate was seen to have settled out. A drop of the liquid examined microscopically at the end of the boiling displayed a field of very minute disconnected particles presenting a resemblance to the molecular base of chyle.

Increasing afterwards the creatinine by using a 2 per cent. strength of solution, the boiling failed to be attended with any show of reduced oxide. Ammonia was from the start very freely evolved. The blue soon changed to green, which faded and became replaced with a brownish tint that passed on to reddish-brown, ruby red, and deep brown, translucency all the time being maintained. After a quarter of an hour's boiling ammonia was still being evolved and nothing throughout was apparent that could be taken as representing a show of precipitation.

Creatinine, then, has an effect of a very different nature from that of an ordinary reducing body upon Fehling's solution, and the conclusion forces itself on the mind that ammonia is an important factor in connexion with what is noticed to occur. As long as sufficient ammonia is present to hold in solution the reduced oxide that is formed there can be no appearance of precipitate. With reduction fading of the blue colour of the test ensues and the conditions may be such as to determine a complete removal of colour, but no precipitate can fall as long as ammonia is being liberated to a sufficient extent to hold the generated suboxide in solution. Probably the motley series of colours observable after prolonged boiling, especially in the presence of a considerable quantity of creatinine, are due to extraneous decompositions that occur whilst the suboxide is being prevented from showing itself.

The cupric oxide reducing power of creatinine does not appear to amount to so much as what I find it has been credited to possess. There is no difficulty in making the estimation by means of the ammoniated cupric test. The solution titrates cleanly and the end-point is sufficiently sharp. Variations within certain limits are, however, noticeable in the readings, seemingly due to the rate at which the solution may be run in from the burette. If run in quickly time is apparently not given for the full breaking down of the creatinine and more is run in than might be needed if longer time were given. The results that have been obtained may be said to give to creatinine a reducing

power equal to a fourth of that of dextrose—in other words, it requires 40 milligrammes of creatinine to produce the amount of reducing action that is effected by ten milligrammes of dextrose. Under this reckoning the reducing effect on Fehling's solution produced by the one to two grammes, or about this, of creatinine conjectured to be eliminated per diem would count for exceedingly little in relation to the total reducing action exerted by normal urine, instead of occupying a position of significance, as there is a disposition to be assumed it does by some observers.

Calculating in the same way as was done for uric acid, the apportionment of the reducing power of normal urine to be assigned to creatinine comes out as follows: if 1·5 grammes of creatinine and 1500 cubic centimetres of urine be taken as representing the elimination amounts for the 24 hours the relation of creatinine to urine will stand at 1 per 1000. 40 milligrammes of creatinine, as shown above, may be taken as having the same reducing power as 10 milligrammes of dextrose. The reducing power therefore to be reckoned for the one gramme of creatinine is equivalent to $\frac{1 \times 10}{40}$ = 0·25 per 1000 expressed as dextrose. The mean total reducing power for normal urine was found to be 2·79 per 1000 expressed as dextrose, and, from the data given, 0·25 per 1000 of this, or practically one-eleventh, constitutes the proportion to be assigned to creatinine.

*(To be continued.)*

## A CASE OF CEREBRO-SPINAL MENINGITIS DURING PREGNANCY.

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THE following are a few notes of a case of cerebro-spinal meningitis during pregnancy. It is interesting from more than one point of view: the age and condition of the patient, the onset of labour (whilst declaring that she did not know what was the matter with her and denying she was pregnant); the sudden onset of cerebro-spinal meningitis during labour, its rapid course, leaving no time for any very active treatment of service; the look of the patient; the character of the petechial and herpetic eruptions, without head symptoms; and the persistent vomiting, which in this case, at the time being associated with labour, did not demand the same amount of attention that in other circumstances it would have received.

The patient was in a neighbouring town up to Christmas, 1896, when she came home to Belfast to a street in a working-class locality. She was aged 13 years and 9 months; her mother gave the age in evidence at the coroner's court as 14 years on May 23rd, 1907. She was admitted on March 5th, 1907, to the maternity department of the Ulster Hospital for Children and Women as being in labour. The patient had always been a strong, healthy girl, well developed, and had never menstruated. The history of the case as reported to me was that on March 25th, about 2 A.M., the patient was seized with violent pains in the lower part of the back and abdomen, accompanied with vomiting; the pains were not continuous but paroxysmal; she became so ill that a medical man was sent for about 4 A.M. He prescribed medicine and advised certain measures to give her some relief; later he (the medical man) returned accompanied by another medical man, and on consultation both agreed that the patient was in labour. This the patient denied, protesting against anything of the kind. On telling her mother what was the matter the latter expressed her astonishment at anything of the sort as she never thought such a thing possible owing to her age and appearance. The patient absolutely refused to give any information regarding her condition to anyone. At 12 noon the patient was admitted to the Ulster Hospital. There was then a temperature of 101° F. and the pulse was 100, full, and bounding. There were strong uterine contractions at intervals of about ten minutes. There was no vomiting. There was slight mucoid diarrhœa, the cheeks were slightly cyanosed, and there was herpes about the nostrils and the mouth. No rash at this time was present; the tongue was furred but moist, and the pupils reacted normally. She had a wild and frightened appearance, was quite conscious, and complained of no pain in the head.

On vaginal examination the passage was moist and dilatable, the os was very slightly dilated, the presentation being a vertex but very high up in the pelvis. The patient remained in much the same condition until 2 P.M., when the pains became almost continuous, breathing was very rapid and distressed, the cheeks and lips were more deeply cyanosed, and the pulse was rapid and irregular. I was at this stage summoned by telephone to see the patient who was reported as being in the maternity ward and in labour. Almost immediately I received a second message to say that the patient was in a state of collapse and to come at once. I replied to give a hypodermic injection of strychnine and I would go over immediately, which I did and found the patient in bed lying on her right side, the legs flexed on the thighs, and the thighs on the abdomen; the forearm was flexed on the arm and both the arms were lying on the front of the chest; she was conscious, the pupils were slightly dilated and equal in size, the face was cyanosed, the breathing was rapid and difficult, the pulse was quick and irregular, and she was to all appearance in labour. She was nervous and frightened looking but did everything she was asked to do.

I got her turned over on to the left side and made a vaginal examination with some difficulty; the passage had the feeling as if contracting on the finger; the rugæ of the vagina were well defined. With some difficulty I reached the os, which was slightly dilated, admitting the tip of my finger. I was able to make out the presentation a vertex. With the left hand on the abdomen I could feel the uterus hard and contracting; her attitude and appearance did not harmonise in my opinion with the stage of labour and I felt that there might be something the matter in her chest. On examining the chest I arrived at the opinion that there was well-marked congestion of both lungs, the heart was acting rapidly and irregularly, and I was unable to make out any valvular lesion. No urine could be procured by catheter. Neither the face nor the extremities were œdematous. I also noted that she was very sensitive to the touch (hyperæsthetic). I got her turned on the back in order to examine the abdomen to learn if the child were still alive. The breasts were well developed, secondary areolæ were well marked, and there was a knotted feeling, and on pressure fluid exuded through the nipples. On stethoscoping over the uterus the fœtal heart sounds were heard very indistinctly and I observed some dark spots of a peculiar shape and appearance over the lower part of the abdomen and the thighs, which on investigation I learned had developed since her admission to hospital. The spots were dark in colour, irregular in shape and size, some flat, others raised like a small blister, and on pressure the colour did not disappear. These with her look and condition suggested cerebro-spinal meningitis. She, however, very quickly got worse though still remaining perfectly conscious, complaining only of the uterine contractions and pain in the back. There was no pain in the head but great pain and difficulty in swallowing, together with heavy breathing, death supervening about 3.50 P.M.

The patient's condition was so serious when I first saw her that I felt no obstetrical interference would prove of any service or obviate a fatal result to either mother or child; rapid dilatation of the os and removal of the fœtus might have been attempted but had I endeavoured to do anything of the kind death would have followed even more quickly and question, could I have saved the child had it been alive? Removal of the fœtus by Cæsarean section might have been adopted but I doubt very much if the child could have been saved.

In conjunction with Dr. J. Martin I made a post-mortem examination that night in the public mortuary. The body was stout, well built, well developed like a woman of small stature, and well nourished. There were no marks of any kind on the body other than the dark spotted rash (as described) over the abdomen and the thighs. Rigidity was well marked. On opening the skull the membranes of the brain were congested and the blood-vessels were full; also there was a greater quantity of serous fluid than ordinary in the cavity of the cranium. The brain was otherwise natural in appearance; there was more serous fluid than normal in the ventricles, and the internal blood-vessels were congested. The spinal cord was not examined; as the evidence of cerebro-spinal meningitis was so manifest we

thought it unnecessary. The pleura was congested and the pleural cavity contained more serous fluid than natural. The lungs were dark and markedly congested. With regard to the pericardium the cavity contained more serous fluid than normal. The heart was slightly enlarged and the valves were healthy. Ante-mortem clot was present. As to the abdomen, the peritoneum was congested and spotted all over with black spots of various sizes and different shapes. There was more serous fluid than normal in the pelvic cavity. The uterus extended up close to the xiphoid cartilage of the sternum and corresponded with a uterus at full term. The peritoneum over it was congested and contained dark spots. On opening the uterus a full-term male child was removed; it was a well-developed, healthy-looking infant; the skin was healthy and without any spots or marks of any kind. The placenta, membranes, and cord were normal in size and appearance. The mesenteric glands were congested, which has been shown lately in Germany to be important from a diagnostic point of view, a view confirmed by Professor W. St. C. Symmers of Belfast. The liver was enlarged and full of blood. The gall-bladder was full of bile and the coating of the bladder was covered with dark spots. The spleen was enlarged and full of blood. The kidneys and suprarenal capsules were congested. The pancreas was congested. The stomach contained a little food with some dark grumous matter which was evidently the medicine prescribed that morning. There were dark spots over the mucous surface, which was also congested. The small and large intestines were congested and almost empty; Peyer's patches were congested and the walls of the intestines were spotted. The bladder was empty and on opening it the mucous surface was covered over the whole surface with small dark spots. As this case occurred in the earlier stage of the epidemic I regret bacteriological examinations were not made.

## THE TREATMENT OF TRYPANOSOMIASIS.[1]

BY A. NIERENSTEIN, PH.D.,
OF THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

THE therapeutics of the present time for trypanosomiasis can be divided into the following.

*A. Arsenic compounds.*—1. Arsenious acid. 2. Fowler's solution.

*B. Colours.*—1. Colouring matters belonging to the diazo group, Ehrlich's trypanred and Mesnil's afrodol blue and afrodol violet. 2. Colouring matters belonging to the triphenyl-methan group, Ehrlich's malachite green and fuchsin.

*C. Atoxyl*, which being an organic compound of aniline and arsenious acid cannot be considered as merely "an arsenic compound," an expression recently used in the lay press.

The introduction of an acid radicle into an amido nucleus generally changes its basic character and of course, on the other hand, lessens the acidity. The combined effect of aniline and arsenic is therefore the resultant of these two factors: amido group and arsenious acid. We have been able to demonstrate experimentally that either the amount of aniline generally given in the form of atoxyl or the arsenious acid contained in that drug when administered alone will kill an animal within a few hours after the injection.

*D. Combined treatment.*—1. Combination of arsenious or acid atoxyl with colouring matters, as trypanred suggested by Thomas and Breinl, Laveran and Mesnil, and others. 2. Atoxyl and strychnine—van Campenhout. 3. Atoxyl and sublimate. The last-named treatment has recently been worked out in the Liverpool School of Tropical Medicine and the results obtained on rats are very promising.

We who have been working in the Liverpool School of Tropical Medicine found that in infected rats (Trypanosoma Brucei), one part of which were treated with atoxyl alone and the remainder with atoxyl followed by mercury, the first lot generally had relapses in from 16 to 25 days, while a great number of the animals treated with atoxyl and mercury are still alive, some after a period of nine months. These results are certainly encouraging. In our treatment we used, at the beginning, to give high doses of atoxyl in order to drive out the parasites entirely and it was found that if sufficient atoxyl were administered the parasites (Trypanosoma Brucei) would disappear in rats for from 16 to 25 days. A disappearance of the parasites for a similar period was also observed in guinea-pigs and rabbits. Mercury was then given and the treatment stopped. In the bigger animals this double treatment should be continued for some time.

With regard to sleeping sickness we would like to suggest as a routine treatment that one cubic centimetre of a 20 per cent. solution of atoxyl should be given daily for one week, followed by one cubic centimetre of a 1 per cent. solution of sublimate four times. This treatment should be repeated and continued for an extended period and, of course, may require occasional modification. It would perhaps be possible to give mercury in the form of pills. The theory of the action of mercury in this treatment has been discussed in a paper published in the Annals of Tropical Medicine and Parasitology of the Liverpool School of Tropical Medicine, Vol. I., No. 2.

It has been found that the toxic effect of atoxyl can be diminished by acetylating the atoxyl. Such an acetylated atoxyl is an antipyrine which contains arsenious acid. Acetylated atoxyl has been shown to be of use in mice by Ehrlich and in dogs by our experiments. We found, as a rule, that when atoxyl was given in a sufficient quantity to drive out the parasites (nagana) in dogs the host was also killed, but using acetylated atoxyl we have been more or less successful. An interesting fact, pointed out by Ehrlich, is that the parasites can get used to a drug and become resistant. It is therefore advisable to alternate various trypanocidal agents in the treatment as much as possible, that is, to give atoxyl, some other trypanosome-killing drug, and mercury; for example, atoxyl, fuchsin, or some other colouring matter by the mouth, and sublimate.

It has usually been recommended to give atoxyl in high doses at the beginning. Whether or not this is of benefit is a question, as the atoxyl apparently accumulates in the body and the toxic effect appears after a time. In laboratory experiments we have frequently noticed that even after the treatment had been stopped for a week toxic effects appeared and this could only be due to the fact that atoxyl had accumulated in the body and the arsenic had been slowly broken up. We would like to refer to one experiment; a rat was treated about nine months ago with atoxyl and is still showing toxic effects.

We think it necessary to point out that the administration of atoxyl should be given a very careful trial but that extremely high doses should be avoided as much as possible. The action of atoxyl seems to be very much on the nervous system, as neuritis is frequently caused by the administration of this drug. Blindness has also been observed after the use of atoxyl and the question therefore arises whether it would not be well to counteract somewhat the effect of atoxyl by making it less operative on the brain and nerves. This might be done by introducing radicles which are more fixed to the blood and less to the nervous system.

We think it necessary to draw attention to experiments which we have made in connexion with the reappearance of trypanosomes after treatment with atoxyl. We found that strains obtained from animals which had had relapses were sometimes much more virulent. Our nagana strain, used for work generally, killed a rat in from five to seven days. This strain was followed up, commencing on Jan. 14th, until May 5th by subinoculation from one rat to another; four drops of blood were always used. In none of these rats was any sudden increase of virulence noticed, but in experiments with the strain obtained from animals in which the trypanosomes had reappeared it was found that the experimental animal was killed in from three to five days. Out of 17 rats used for these experiments 11 showed a remarkable increase of virulence. Similar work done with Trypanosoma dimorphon showed the same increase of virulence. Our strain used to kill a rat in from 15 to 17 days and we found that in four out of six strains obtained through relapses after treatment by atoxyl the virulence obtained was from 11 to nine days. We have recently obtained through atoxyl a Trypanosoma dimorphon strain which kills a rat in seven days. Similar work with Trypanosoma Gambiense is now in progress.

It was our intention not to publish the results of this work until we had satisfied ourselves that Trypanosoma Gambiense behaves in a similar way, but since it is intended to commence atoxyl treatment on a large scale in Uganda we feel that a warning in this direction should be given.

These observations emphasise the necessity for careful

[1] A paper read before the Society of Tropical Medicine and Hygiene on July 10th, 1907.

selection of "fly free" sites for the separation camps and for some provision by which treated natives may be kept under observation for considerable periods.

The atoxyl and mercury treatment lately used in our laboratories gives, when compared with atoxyl, fairly permanent results and if an atoxyl treatment should be undertaken in Uganda it would be advisable to start at once with this combined treatment, even if the reliability of this double treatment has so far not been fully established.

Summarising, we would like to suggest in the treatment of sleeping sickness: a fresh 20 per cent. solution of atoxyl, warmed up to 40°, to be administered in small doses to commence with and the doses to be gradually increased, not, if possible, passing the limit of one cubic centimetre of a 20 per cent. solution. The atoxyl to be followed as soon as possible by mercury in the form of sublimate and, in addition, some other trypanocide to be given; we would specially recommend fuchsin. We have lately tried a large number of colouring matters, both Ehrlich's and Mesnil and Nicolle's, and have come to the conclusion that fuchsin is the most promising. In addition to this, as was insisted upon by Thomas and Breinl, the general strength of the patient must be sustained in every way possible.

Liverpool.

## CEREBRAL HYPERÆMIA AS A FACTOR IN THE THERAPEUTIC ACTION OF LUMBAR PUNCTURE.

(ILLUSTRATED BY A CASE OF TETANY.)

BY FRANK C. EVE, M.D. CANTAB., M.R.C.P. LOND.,
PHYSICIAN TO THE ROYAL INFIRMARY AND TO THE VICTORIA HOSPITAL FOR CHILDREN, HULL.

IT has commonly been assumed that any benefit which may result from lumbar puncture is due solely to relief of intracranial tension. And when (as usually happens) the tension is not measured at the time of puncture, this is the natural assumption. During the past few years I have always measured[1] the intracranial tension during a lumbar puncture, and have been led to the provisional conclusion that relief of tension should be given therapeutic credit only in cases where the hypertension is considerable; and that where the pressure is normal or slightly raised the benefit which sometimes results from lumbar puncture should be ascribed to other causes. These causes may well be manifold, but I would like to advocate the predominant claims of one factor which, so far as I know, has not received attention. And that factor is the marked passive *hyperæmia* of the cerebro-spinal vessels which must inevitably result from the removal of any considerable quantity of cerebro-spinal fluid. For, owing to the uncollapsible bony envelope of the central nervous system and to the inextensibility of its nervous and liquid contents, it follows that for every ounce of cerebro-spinal fluid removed an exactly equal quantity of blood will be added to the contents of the cerebro-spinal vessels. In other words, an equivalent hyperæmia will be produced. And if, as is frequently the case, an ounce or an ounce and a half of fluid is withdrawn, the consequent engorgement of the vessels must be very considerable. For if at the end of the puncture the pressure is zero, it means that the venous pressure has pushed out cerebro-spinal fluid until the veins are distended to their natural limits. To regard this hyperæmia in another light, it is reasonable to suppose that the addition by lumbar puncture of one and a half ounces of blood to that normally contained in the blood-vessels of the brain and cord might almost double their normal blood quantum, though I do not know the exact amount of this. The brunt of the engorgement produced by puncture would certainly fall on the thin cerebral veins. How far the hyperæmia would affect the venous twigs and capillaries, and hence diminish the resistance and increase the blood-flow, could scarcely be decided except by experiments.

### *Illustrative Case of Tetany treated by Lumbar Puncture.*

This case is recorded partly because it illustrates the above thesis that the therapeutic value of lumbar puncture is largely and sometimes solely due to the hyperæmia produced, and partly because I believe it to be a new treatment for a rebellious case of tetany which had resisted all other ordinary remedies.

The patient was a healthy boy, aged four years, who betrayed a neurotic constitution by nocturnal enuresis and by his capricious moods and his often anxious and fretful expression. The morbid excitability of his nerves was shown by the contraction of the circumoral muscles in response to mechanical stimulation of the seventh nerve by a penholder. The onset was acute and idiopathic a fortnight before admission, the mother noticing first a limp and then painful contractures of the hands and feet.

On admission walking was impossible owing to the contraction of the calf muscles, which drew up the heels two inches from the ground. The flexors of the forearms were also firmly contracted, producing flexion of the extended fingers and marked adduction of the thumbs. In other respects, including reflexes, appetite, and sleep, the child was healthy.

Treatment for 12 days consisted of tonics with open air (balcony) day and night. Then five days of aperients and vermifuges in response to a history of worms eight weeks previously. Next 11 days of energetic sedative treatment with chloral and bromide. The case had now a duration of six weeks with a month of hospital treatment without the slightest improvement, and there was the fear of the condition lapsing into chronicity. Encouraged by former success[2] in a few other refractory subacute cerebral conditions, I stopped all other treatment and tried the withdrawal of an ounce of cerebro-spinal fluid by lumbar puncture under chloroform. The pressure was normal (200 millimetres of water). Next day the child was more rigid, but from that time onwards improvement was rapid and complete. In three days the fingers could be voluntarily extended and in 12 days he could walk, but even after three weeks one heel would not quite touch the ground. The child was sent for a fortnight to the seaside and when finally inspected seven weeks after the puncture there was nothing to be made out except a scarcely noticeable tendency to adduction of the thumbs.

It will be noticed that in this case care was taken to eliminate the effects of bed and hospital environment. It will also be noted that ordinary remedies were ineffectual and that the contracture was in a stationary condition. The case convinced me therefore as strongly as any single therapeutic observation could, that the withdrawal of an ounce of cerebro-spinal fluid was responsible for the cure of this child. And since the pressure was normal, it seemed legitimate to conclude that it was the *hyperæmia* which had favourably affected the nutrition of the disordered nervous tissues in somewhat the same favourable manner as it has been shown by Bier[3] and others to act in more accessible regions of the body.

In view of the almost harmless nature of lumbar puncture under suitable conditions, it seems justifiable to try it in a variety of acute or subacute cerebral affections which have resisted other treatment or are tending to become chronic. But until its indications are better understood lumbar puncture could scarcely be advocated until other remedies had failed.

Hull.

[1] With my cerebro-spinal manometer. See THE LANCET, April 22nd, 1905, p. 1607.

[2] Ibid.

[3] The hyperæmia of lumbar puncture would not be quite analogous to that of Bier's method, which in the case of the head would be produced by a ligature round the neck. Presumably this would produce engorgement of the cerebral veins when sufficient cerebro-spinal fluid had been gradually expelled, but it would be accompanied by increased cerebro-spinal pressure and a diminished blood flow owing to the embarrassment of the venous return.

# Medical Societies.

## THE SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

*Piroplasma Canis.—Exhibition of Specimens.—Life Cycle of the Parasite of Sleeping Sickness.—Parasitic Protozoa observed in Africa.—Treatment of Trypanosomiasis.*

A MEETING of this society was held on July 10th, Sir PATRICK MANSON, the President, being in the chair.

Dr. J. W. W. STEPHENS of the Liverpool School of Tropical Medicine showed specimens prepared by Captain

S. R. Christophers, I.M.S., illustrating the Developmental Cycle of Piroplasma canis in the Tick: (1) the parasite enlarged in the gut of the tick and became a motile club-shaped body, which then left the gut and penetrated an ovum, becoming in the substance of this a "zygote"; (2) this zygote increased in size and broke up into "sporoblasts" which were found disseminated in the tissues of the larva; (3) these sporoblasts further divided and accumulated as "sporozoits" in the salivary glands of the nymph; and (4) also sporozoits accumulated in the salivary glands of the adult tick. Experiment showed that the adult took infection and the nymph and "daughter" adult gave infection and corresponding to this "sporozoits" were found in the salivary glands of the tick at both these stages. The cycle of development appeared thus to be a very simple and uncomplicated one. The next exhibit was one of the parasite, discovered by Darling in Panama, Histoplasma capsulata (1906). The parasite was an intracellular one resembling somewhat Leishman-Donovan bodies and existed in immense numbers in the lungs, the liver, and the spleen. The following new helminths were also exhibited: (1) a new Bothriocephalid in man from Tasmania or Syria; (2) a new Nematode in man from China; and (3) a new Echinorhynchus in man from British Honduras.

Dr. A. BREINL of the Runcorn Laboratory (Liverpool School of Tropical Medicine) demonstrated the Life Cycle of the Parasite of Sleeping Sickness. In rats with Trypanosoma Gambiense the disease ran a fluctuating course. While the parasites were increasing in the blood amitotic division of nuclei and longitudinal fission were observed, but no nuclear changes or marked dimorphism. When parasites were most numerous from 5 per cent. to 20 per cent. of trypanosomes were seen with a thick stainable band growing out from the micro-nucleus and extending towards, sometimes passing beyond, the nucleus. In some cases the band entered into direct contact with the nucleus, sometimes it passed round the side of the body; subsequently it disappeared. When the number of parasites was falling rapidly, trypanosomes were observed with a clear space round the nucleus in the lungs, the spleen, and the bone marrow. In the bone marrow and spleen there were also forms in which the trypanosome body had disintegrated with flagellum and remains of micro-nucleus detached. The nucleus was intact. These forms underwent further change. The nucleus of each parasite budded off a small micro-nuclear granule, from which a new flagellum grew out. The life cycle began again with these small trypanosomes. The micro-nucleus originated from the macro-nucleus. In subsequent division the process was analogous to separation of two kinds of nuclei destined to conjugate. There was a pair of such nuclei in each trypanosome, which united when the number of parasites was at a maximum. In rats infected with Trypanosoma Gambiense and treated with atoxyl some parasites became rounded, formed a distinct membrane, threw off the flagellum, and remained unchanged for a prolonged period. The method employed was that whereby blood films or "organ-smears" were fixed wet; they were then stained and mounted in the usual way. The specimens were fixed in Flemming's fluid.

Dr. A. NIERENSTEIN, also of the Runcorn Laboratory of the Liverpool School of Tropical Medicine, read a paper on the Treatment of Trypanosomiasis, which is printed at p.228 of our present issue.

Dr. J. L. TODD, of the same laboratory, described certain Parasitic Protozoa observed in Africa, dealing more especially with Leucocytozoon Ziemanni and with an interesting cycle of development of Trypanosoma loricatum of frogs.

The PRESIDENT observed that atoxyl now gave them some hope of encouragement in the treatment of trypanosomiasis. Arsenic undoubtedly had the power of deferring and postponing the fatal ending and it was reasonable to suppose that the chance of recovery was thereby increased. His plan was to give small doses of atoxyl and gradually to increase them, not going beyond 50 to 60 minims of a 10 per cent. solution. He considered that the suggestion to combine the atoxyl treatment with mercury was sound.

ROYAL WATERLOO HOSPITAL FOR CHILDREN AND WOMEN.—An Art and Loan Exhibition will take place at the Doré Gallery, New Bond-street, London, W., from Nov. 1st to 21st next in aid of the funds of the Royal Waterloo Hospital for Children and Women.

# Reviews and Notices of Books.

*Ulceration of the Cornea.* By ANGUS MACNAB, B.A., B.Sc. N.Z., M.B., Ch.B. Edin., F.R.C.S. Eng., Chief Clinical Assistant, Royal London Ophthalmic Hospital. London: Baillière, Tindall, and Cox. 1907. Pp. 196. Price 5*s.* net.

AN attempt has been made in this book to classify ulcers of the cornea upon a bacteriological basis. Doubtless this is a step in the right direction, though in the present state of knowledge the result is somewhat disappointing. Indeed, it is probable that it can never be wholly satisfactory, for though in many cases the infecting organism may determine the type of ulcer there are often other factors which play a preponderant rôle, notably the conditions of resistance of the tissues, profoundly modified as these are by general asthenia, endogenous toxins, "trophic" nervous influence, and so on. The aim of classification should therefore be rather towards a broad pathogenic basis than the narrower bacteriogenic.

Mr. MacNab has clearly devoted much attention to the bacteriology of corneal ulceration and this part of the work is by far the best and merits commendation. It is pervaded with the teaching of Axenfeld, the *doyen* of ophthalmic bacteriology, to whom the author dedicates the book, and owes much to the recent researches of German investigators, among whom Zur Nedden and Römer may be specially mentioned. An excellent chapter is devoted to the ulcus serpens, or, as the author prefers to call it, the pneumococcal ulcer. The clinical features, pathological anatomy, bacteriology, and treatment of ordinary hypopyon ulcer are very lucidly described and stress is rightly laid upon the importance of radical treatment of the lacrymal complications which are so often present in these cases and play so fundamental a part in their causation. Atypical hypopyon keratitis next receives attention and this chapter contains many facts relating to the bacteriology of the subject which will probably be new to many English readers. Streptococcus pyogenes, bacillus pyocyaneus, Friedländer's pneumobacillus, and aspergillus fumigatus are accepted as causal agents, whilst the association of bacterium coli commune, staphylococcus pyogenes, rosa hefa, hay bacillus, and others is more likely to be fortuitous. Bacillary ulceration includes diplobacillary infection with the organism first simultaneously described by Morax and Axenfeld, and marginal ulceration by Zur Nedden's bacillus which nearly resembles Friedländer's pneumobacillus. Mr. MacNab differs from previous observers in attributing ulceration of the cornea much more frequently to the bacillus duplex. When the frequency of diplobacillary conjunctivitis is taken into consideration it is by no means surprising that the organism should be often found on so-called "catarrhal" ulcers, but this is very feeble proof of an etiological relationship, though it seems to be the only one which the author brings forward.

Ulceration of the cornea occurring in acute conjunctivitis receives rather scanty discussion, particularly noticeable in gonorrhœal conjunctivitis which is quite inadequately treated. Even more pronounced is the falling off in the description of cornea conditions in which bacteriogenesis is obscure or out of court. These sections of the book seem to have been included merely for the sake of completeness, and as to the section on neuroparalytic keratitis few neurologists would accept the view propounded of the origin and distribution of the "trophic" nerves.

It is obvious that so large a subject as ulceration of the cornea cannot be exhaustively discussed in a brochure of 187 pages of text. Some parts are very elementary; others presuppose an advanced knowledge of the subject, as, for example, in the references to so-called ring abscess. It is

worth perusal by ophthalmologists as introducing them to the more recent work, chiefly in Germany, on the bacteriology of corneal ulceration, and this is probably the chief service which it may be expected to render. The printing, otherwise good, is marred by several misprints and some errors in spelling.

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*Modern Methods of Diagnosis in Urinary Surgery.* By EDWARD DEANESLY, M.D., B Sc. Lond., F.R.C.S. Eng., Honorary Surgeon, Wolverhampton and Staffordshire General Hospital. London: H. K. Lewis. 1907. Pp. 97. Price 3*s.* net.

THE want of a brief and concise *résumé* of the modern methods of localising and distinguishing surgical diseases of the urinary organs has long been felt. This gap in scientific literature has now been adequately filled by Dr. Deanesly's little book. The work is based on a large clinical experience and is intended rather for the general surgeon than for the urinary specialist. The first chapter on the interpretation of urinary symptoms contains much information that is extremely useful. The author classifies these symptoms under the following headings: (1) disorders of micturition; (2) pain referred to some part of the urinary tract; (3) abnormal conditions of the urine; and (4) palpable enlargements or malformations of affected organs; and subsequently he clearly points out the significance of each and indicates the deductions to be drawn in arriving at an accurate diagnosis. The discussion of abnormal conditions of the urine is rightly relegated to a separate chapter which concludes with a description of the methods employed in gauging the functional value of the kidneys. Dr. Deanesly emphasises the importance of separation of the urines and for this purpose advocates the use of Luys's segregator which, he maintains, is quite as accurate as the ureteral catheter and above all free from the danger of infecting the kidneys. The chapter on the differential collection of specimens of urine is a very valuable one and full of practical hints. As might be expected in a work of this nature the cystoscope receives its full share of attention. The author favours Nitze's instrument and after describing its general principles gives detailed instructions for its use. This little book, besides being well written, is essentially practical and should prove a welcome addition to the library of the practitioner and general surgeon.

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*Functional Nervous Disorders in Childhood.* By LEONARD G. GUTHRIE, M.A., M.D. Oxon., F.R.C.P. Lond. (Oxford Medical Manuals.) London: Henry Frowde and Hodder and Stoughton. 1907. Pp. 300. Price 7*s.* 6*d.*

JUST as the last quarter of the nineteenth century was marked by a remarkable advance in our understanding of the diseases of infancy and childhood, so now in the first decade of the twentieth century medical interest—and not only medical interest—centres in the physiological aspects of the developing child. These aspects are certainly rendered all the more intelligible by the light which pathology throws upon them. In his work on "The Functional Nervous Disorders of Childhood" Dr. Leonard Guthrie elucidates many of the perplexing problems involved in the study of the normal child by devoting considerable attention to that large class of borderland cases which are generally described as neurotic and which, strictly speaking, cannot be called either physiological or pathological. The management of these cases is of equal interest to the physician, to the psychologist, and to the pedagogue, and it is difficult to say to whose jurisdiction they should be most properly referred. It is a mere truism to say that the neurotic child is the subject *par excellence* of functional nervous disorders, but the neurotic child is the most interesting of all children for the reason that from him most is to be expected and from him most to be feared. Owing to the nervous instability which is characteristic of the class the most trivial physical stimuli produce the most disproportionate effects; this makes such children difficult to manage, physically and mentally. No one, as Dr. Guthrie remarks, would deny that a certain leaven of the neurotic element is "the spice of life"; the creative faculty in art, science, and literature depends on imagination and upon emotional susceptibility, but the neurotic temperament which combines these qualities requires the most judicious and sympathetic handling during the period of early development. As Dr. Guthrie tells us, "The lives of men and women such as Wagner, Berlioz, Charles Lamb, Charles Dickens, Carlyle, George Eliot, and many others were embittered and their genius trammelled by cerebral and gastric neurasthenia," and this through "want of sympathetic and judicious treatment in their youth." How many "undiscovered millions" remain in obscurity to-day from the same cause? Parents, the author tells us, are now fully alive to the influence of mind upon disease, and they desire to know how hereditary tendencies to moral failings as well as to disease may be counteracted. "Hence," he continues, "our professional armamentarium is no longer completed by a set of infallible prescriptions for coughs, worms, stomach-ache, and fits. ..... We are expected to use our knowledge of the characteristics of such children and to back our medical advice with common sense in treating them." For any child or any individual to be a success he must remain in harmony with his environment, but it is difficult for the neurotic child to remain at peace with his surroundings, for he is so susceptible to every change that occurs in them; if he fails to remain in harmony, it may be either the fault of the environment or the fault of his organisation, and if it be the latter the further question has to be considered, Is this due to hereditary and unpreventable causes, or to conditions over which the human will has control?

In dealing in various ways with these questions the author is faced *ab initio* with the problems of heredity. If acquired characteristics of the mind or of the body cannot be transmitted in descent, the progress of human evolution can only be advanced by means which are directly or indirectly dependent on selection, whereas a prospect of unbounded optimism at once opens up if we can convince ourselves of the truth of the alternative hypothesis. It is a very curious fact that Virchow should have admitted the possibility of the transmission of acquired pathological characteristics, while he denied the same right to those which were physiological. The truth or the falseness of the general postulate (whether acquired characteristics can be inherited or not) is, as Herbert Spencer contended, of the utmost importance to mankind, for according to the manner in which we regard this question so are determined our actions in politics, ethics, sociology, and, we may add, in medicine. Dr. Guthrie wisely touches but lightly on this controversial question: he confines himself more profitably to the other aspect of the question—namely, how to find the best possible environment for the child, and especially the neurotic child, be his hereditary or congenital faults what they may.

It is impossible in the limits of a short review to follow the author in his discussion of the many aspects of the management and recognition of the functional neuroses and psychoses of childhood. In the early chapters he moralises on the unnecessary sorrows of childhood, the fears of the neurotic child, his frettings and home sicknesses. He describes the disorders of sleep, their causes and treatment; then he points out the moral failings of a child with "a temperament" and blames the pedagogue or parent who submits him to mental overstrain or galling discipline. The more definite medical aspects are dealt with in the concluding chapters in which the disorders of the sympathetic nervous system come first and present a goodly array of symptoms. Then enuresis,

cyclical albuminuria, pyrexia, and vomiting are described; then come the spasmodic affections, chorea, the tics, stammering, and other defects of speech. The disturbances of primary dentition are also considered at some length, but on the whole we think that this is one of the least satisfactory and convincing chapters. In the warmth of his argument in favour of the view that the symptoms incidental to the period of teething are not due to the physiological act of dentition but to some concomitant condition, the author takes a less philosophic and broad-minded view than in his handling of other subjects. May it not be that in the narrow jaw of the civilised child the physiological process of dentition becomes relatively pathological, just as in the case of the civilised woman the narrow and often rachitic pelvis makes the physiological act of parturition a distinctly painful operation? Moreover, we feel much inclined to challenge the statement that irritation of the dental branches of the fifth nerve can produce otalgia but not suppurative otitis media. Minor defects of this kind, if indeed they be defects at all, do not detract from the high standard of general excellence maintained throughout the work. All the chapters afford pleasant reading and most of them take the form of lectures which have been delivered before various societies but heretofore have not been published. The book has distinct literary merits apart from merits of a purely medical description; it is the work of a scholar and is full of fascination and suggestiveness, and moreover contains much cut and dried information. We commend it to the notice of all our medical brethren.

## LIBRARY TABLE.

*Surgical Diagnosis: A Manual for Students and Practitioners.* By ALBERT A. BERG, M.D., Adjunct Attending Surgeon to the Mount Sinai Hospital, New York. Illustrated with 215 engravings and 21 plates. London: Henry Kimpton. 1906. Pp. 543. Price 16*s.* net.—It is true that diagnosis cannot be taught by books; in the wards and in the out-patient rooms the student must learn this most difficult part of surgery. The advances of the last 40 or 50 years have greatly enlarged the surgical field and new methods of diagnosis have sprung up. We have therefore more to diagnose than had our predecessors, but we have also more means of diagnosis, and books can give very definite assistance in utilising to the full these diagnostic aids. This book is as good as any that we have seen and it should prove useful if used in the right way. If used apart from a case it will not be of much value, but if the student employs it in connexion with actual cases it will do much to increase his powers of diagnosis. There are a few errors which should be put right in a second edition; for instance, on page 151 the title of an illustration is given as "parenchymatous stroma"; of course, this should be "struma," but in English struma is never used for a goitre and the text never mentions the word, so that we imagine that a reader might easily be confused.

*Traveller's Practical Manual of Conversation in Four Languages: English, French, German, and Italian.* London: E. Marlborough and Co. 1907. Pp. 144. Price 2*s.* 6*d.* net.—This will be a most useful little book for travellers on the continent to possess. In appearance it is just like a thin wallet or pocket diary and this inconspicuousness will be appreciated by many of those to whom frequent reference to such a book in public places is absolutely necessary. The book consists of Travel Notes, Conversations arranged in alphabetical sections commencing with "Apartments," "Arrival," "Bathing," "Breakfast," and so on, a section of numerals, and, lastly, a dictionary of useful words. We have noticed but few mistakes and those are accidental misprints. It may be as well to mention them so that they may be afterwards corrected. On p. 85 "gebleiben for "geblieben." On p. 86 "aupara-paravant" instead of "aupar-avant." On p. 111 "Gehion" for "Gehirn." On p. 116 "lirraison" and "dittribution" for "livraison" and "distribution." Although we certainly learnt at school that "jus" was French for gravy we apparently must ask on the continent for "sauce," although that word also is given as the equivalent of the English word "sauce." The book reminds us, and usefully so at this time of the year, that "J'aimerais piquer une tête dans la rivière" does not mean, as it appears to, "I should like to prick a head in the river," but means "I should enjoy a dip in the river." By the way, *apropos* of sauce and dipping, we think the French also have another funny way of saying "Take a dip" (no doubt it is rightly excluded from the book) by "J'aimerais me saucer," literally "I should like to sauce myself," although "saucer" is equivalent to the English souse or souce. The little book is certainly worth possessing.

*Text-book of Anatomy for Nurses.* By ELIZABETH R. BUNDY, M.D., late Adjunct Professor of Anatomy and Demonstrator of Anatomy in the Woman's Medical College of Pennsylvania. With glossary and 191 illustrations. London: J. and A. Churchill. 1906. Pp. 252. Price 7*s.* 6*d.* net.—This book is written for the express purpose of giving the nurse who is working in the wards of a hospital a general idea of the anatomy of the human body. In preparing a work of this nature the difficulties which beset the writer are at once manifest. On the one hand, she must avoid the danger of bewildering her readers by setting forth a plethora of facts which can only be grasped by practical work in the dissecting-room, and, on the other hand, she must not treat the subject in too sketchy a manner. Dr. Elizabeth Bundy has struck the happy mean both in overcoming the inevitable difficulties of selection and in presenting the anatomical facts in a simple and intelligible manner. Generally the Basle nomenclature is adopted but in many instances the old names are bracketed with their successors. In arranging the contents the old plan of systematic anatomy is followed but the usual order of subjects is not strictly observed. For example, the description of the blood-vessels is deferred until the student shall have become familiar with the organs from which many of the vessels derive their names. The chapter on each system is prefaced by a short account of the histological anatomy of the structures described and, in addition, brief clinical and surgical notes, such as are suitable for nurses, are incorporated. This is a most important feature and we should like to have seen it developed to a greater extent. A recapitulatory chapter on important regions and structures, such as the triangles of the neck, the inguinal canal, the abdominal and thoracic viscera, and so on, brings the work to a successful conclusion. The illustrations, many of which are borrowed from "Morris's Anatomy," are very numerous and are well executed. The book should meet with a hearty welcome from all nurses, for without a proper knowledge of the human body many of their important duties become mechanical deeds instead of intelligent actions.

*Atlas and Text-book of Dentistry, including Diseases of the Mouth.* By GUSTAV PREISWERK, M.D., Ph.D., of the University of Basle. Authorised translation from the German. Edited by GEORGE W. WARREN, A.M., D.D.S. With 103 coloured figures on 44 plates and 152 text illustrations. London and Philadelphia: W. B. Saunders Company. 1906. Pp. 343. Price 15*s.* net.—The German edition of this handbook was noticed in THE LANCET of Jan. 30th, 1904. The translator, Mr. G. W. Warren, has carried out his task in a commendable manner and has so placed this useful work within the reach of English readers. The feature of the book is undoubtedly the excellent lithographic plates, especially those illustrating the various

diseases of the pulp and of the periodontal membrane. We still think that if the accounts of the various diseases were extended the value of the book would be considerably enhanced.

*Health, Work, and Recreation.* By G. A. HAWKINS-AMBLER, F.R.C.S. Edin. Liverpool: D. Marples and Co. 1907. Pp. 64. Price 6*d.* net.—The author of this little pamphlet has had previous experience in writing for a non-medical circle of readers. He writes easily and breezily, although some may think that his delight in a smart phrase occasionally leads him to transgress the limits of good taste. Mr. Hawkins-Ambler takes for his motto "In medio tutissimus," for he vigorously denounces the cranks who are ranged on both sides of the great hygiene controversies of the day. His most revolutionary doctrine is an attack on the "fetich of the cold bath" for everyone in all seasons. We agree with him that in winter all those who fail to "react" thoroughly to this time-honoured method of ablution are wise to replace it by a short stay in a hot bath, which they may follow by a cold or tepid sponge down. Mr. Hawkins-Ambler advocates nine hours' sleep for the average busy brain-worker. Quite the best advice in his book is contained in his last chapter on recreation, especially in that part which urges on the heads of families their great responsibility in maintaining a cheerful comradeship in the home circle; it is a theme that might well be enlarged upon with great advantage to both fathers and sons. The book is unfortunately carelessly constructed; thus we read in one chapter that the noise of the tramcars keeps the town dweller wakeful and in the next that it hushes him to sleep. The author perhaps deserves sympathy in the marring of a pretty peroration by the misprinting of "Prosperino" for "Proserpina" and "moon" for "noon." On page 61 he writes: "Times of fasting and seclusion were aforetime prescribed by the Church." They are still so prescribed.

## JOURNALS AND MAGAZINES.

*The Dublin Journal of Medical Science.*—The July number of this journal contains an interesting communication from Dr. A. Francis Dixon, in which he offers an ingenious explanation of the necessity for the crossing of the great motor tracts in the central nervous system; he attributes the idea to a conversation once held with Professor G. D. Thane. The theory is founded on the fact that the right half of each retina is connected with the right occipital lobe which is accordingly concerned with the left half of the field of vision; it is reasonable that in animals with binocular vision the side of the body in relationship with the left field—i.e., the left arm and leg, and so on—should be connected with the right cortex which also governs that field of vision. This visual theory is supported by a few observations in comparative anatomy. It is illustrated by a useful plan. The same number contains a careful study of Splenic Enlargement and its Influence on the Blood, by Dr. T. Louis de Courcy, which formed the thesis for his doctorate at the University of Dublin.

*The British Journal of Tuberculosis.*—The third number of this journal is especially devoted to children and treats largely of the sociological side of the great problem of tuberculosis. There are special articles on the Preservation of Children and Adults from Tuberculosis in America, by Dr. S. A. Knopf of New York; Measures Employed in Germany for the Prevention and Treatment of Tuberculosis in Children, by Dr. Adolf Baginsky of Berlin; and on the Protection of Children from the Disease in Scotland and Ireland, by Dr. H. Hyslop Thomson and Sir John Byers respectively. A discussion by many authorities on Tuberculosis and the Child brings forward some important points and the number concludes by noticing several institutions for the treatment of the disease.

# Reports and Analytical Records
FROM
# THE LANCET LABORATORY.

### TIODINE (COGNET).

(ROBERTS AND CO., 76, NEW BOND-STREET, LONDON, W.)

TIODINE is being introduced as an organic iodine compound suitable for administering iodine by injection. It contains very nearly half its weight of iodine. Tiodine is a colourless liquid with a somewhat alliaceous odour. As will be seen from its formula, which is $C_6SN_2H_{13}I$, sulphur is present and its chemical name is thiosinaminethyliodide. Tiodine is soluble in water, is neutral in reaction, and yields abundance of iodine on adding to it an oxidising substance, such as peroxide of hydrogen. It is supplied in pills or in glass bulbs. It is said to be administered without the symptoms known as iodism appearing, even when injected subcutaneously. It has been employed in the treatment of rheumatism, scrofula, and diseases of the respiratory organs.

### DIAMALT PREPARATIONS.

(THE BRITISH DIAMALT CO., 11-13, SOUTHWARK-STREET, LONDON, S.E.)

Two preparations, the one in liquid and the other in dry form, have been submitted to analysis with the following results:—DiaMalt liquid: moisture, 23·75 per cent.; mineral matter, 0·75 per cent.; malt sugar, 59·48 per cent.; protein, 5·88 per cent.; and dextrin, 10·14 per cent. In regard to diastasic activity, this preparation was found to digest five times its weight of starch in half an hour, 20 times its weight in one hour, and over 40 times its weight in three hours. The dry DiaMalt gave the following results: moisture, 1·00 per cent.; mineral matter, 1·90 per cent.; malt sugar, 83·20 per cent.; protein, 5·20 per cent.; and dextrin, 8·70 per cent. This preparation also was found to contain active diastase. In half an hour it digested its own weight of starch, in one hour two and a half times its weight of starch, and in three hours five times its weight of starch. The dry preparation consists of a crisp crystalline powder practically entirely soluble in water. The taste is pleasantly malty. The nourishing quality and digestibility of malt sugar are well known, and this carbohydrate is supplemented in these preparations by proteins and dextrin. The mineral matter consisted chiefly of soluble phosphate. The preparations are evidently obtained with great care from superior maltings, as is evidenced by the excellent flavour of the preparations and by the fact of their containing active diastase.

### STERILISED MILK (DIAMOND REEF BRAND).

(STONE AND SON, MONUMENT BUILDINGS, LONDON, E.C.)

The analysis of this milk showed it to be of the same rich quality as that derived from the Guernsey cow. The results were as follows: fat, 5·05 per cent.; milk sugar, 4·80 per cent.; protein, 3·65 per cent.; and mineral matter, 0·72 per cent. The proportion of fat is very satisfactory, the solid matters altogether amounting to 14·12 per cent., which is quite 2 per cent. over the average. It is stated that the milk is sterilised by a special process. The process must be good, since the flavour characteristic of raw milk has not been spoiled. The milk was perfectly fresh and sweet and free from antiseptics.

### EXTRA STOUT.

(WILLIAM DULLEY AND SONS, LTD., BREWERY, WELLINGBOROUGH.)

According to our analysis this stout represents a highly nourishing malt liquor. It contains no less than 9·67 per cent. of extractives, 6·61 per cent. of which are due to proteins. The alcoholic strength was 5·87 per cent. by weight, or 7·32 per cent. by volume. The mineral salts amounted to 0·25 per cent. and consisted chiefly of phosphates extracted from malt. The flavour was soft and

strongly malty. This stout is known as "extra," which means that it is brewed from a strong wort, the proportion of malt used being greater than is usually the case. The stout was in good condition and free from acid flavour and an objectionable excess of carbonic acid gas.

(1) TABLOID BRAND COMPRESSED STERILISED DRESSINGS; AND (2) TABLOID SLIPPERY ELM WITH AND WITHOUT CARBOLIC ACID.

(BURROUGHS, WELLCOME AND CO., SNOW-HILL BUILDINGS, LONDON, E.C.)

1. We have already referred to the tabloid compressed ordinary dressings which are now issued after having been sterilised and thus afford the busy practitioner a ready aseptic dressing. They occupy very little space and are extremely compact. Amongst those recently received were: compressed absorbent gauze, double cyanide gauze, pleated compressed boric lint, pleated compressed triangular bandages, pleated compressed absorbent cotton-wool, and an open wove pleated compressed bandage. 2. The tabloid slippery elm represents five grains of the mucilage of slippery elm which is employed for its demulcent properties in the treatment of inflammatory affections of the respiratory, intestinal, and urinary tracts. Combined with phenol it may be used in throat affections and internally in diarrhœa and dysentery.

SOUTH AFRICAN WINES.

(J. SEDGWICK AND CO., CAPE TOWN. AGENTS, JEREMIAH LYON AND CO., 4, LOMBARD-COURT, LONDON, E.C.)

Year by year the quality of the wines produced in South Africa improves. As a rule they have shown in the past a somewhat high alcoholic strength and a relatively large proportion of sugar. The specimens recently sent to us by the above firm are, on the contrary, delicate in character, approaching in this respect the light wines produced in Western Europe. The red wine, for example, called Cabinet de Sauvignon, gave the following results on analysis: alcohol, by weight 10·85 per cent., by volume 13·43 per cent.; extractives, 1·57 per cent.; mineral matter, 0·21 per cent.; volatile acidity reckoned as acetic acid, 0·12 per cent.; fixed acidity reckoned as tartaric acid, 0·55 per cent.; and sugar, 0·80 per cent. Though not quite as delicate as a good claret this wine has a very acceptable flavour. It is clean and non-acid to the palate. It is somewhat "full-bodied" and is of the Burgundy type of red wine. The red Hermitage wine is decidedly light in character and the flavour recalls that of a good wine from the Medoc district. Analysis gave the following results: alcohol, by weight 9·71 per cent., by volume 12·05 per cent.; extractives, 1·30 per cent.; mineral matter, 0·25 per cent.; volatile acidity reckoned as acetic acid, 0·126 per cent.; fixed acidity reckoned as tartaric acid, 0·54 per cent.; and sugar, 0·78 per cent. This is a pure, sound, and pleasing type of red wine. Lastly, we examined a white wine known as Drachenstein which is a quite dry white wine of the Rheinwein type. It is, however, somewhat fuller in character than a light moselle or hock. Analysis gave the following results: alcohol, by weight 10·08 per cent., by volume 12·49 per cent.; extractives, 1·52 per cent.; mineral matter, 0·20 per cent.; volatile acidity reckoned as acetic acid, 0·09 per cent.; fixed acidity reckoned as tartaric acid, 0·607 per cent.; and sugar, 0·190 per cent. As will be seen, the wine is relatively free from sugar and is practically free also from volatile acidity. The figures are exactly what might be expected judging the merits of the wine from the point of view of flavour.

GERM PROOF FILTER.

(THE ATKINS FILTER ENGINEERING AND WATER SOFTENING CO., LIMITED, 71, SOUTHWARK BRIDGE-ROAD, LONDON, S.E.)

This filter consists of a container in which three filter tubes of the Pasteur-Chamberland type are fixed. The filtering material is well known to be proof against the passage of organisms, the only drawback being the slow rate at which the water filters through. Extreme filtering efficiency can, however, only be secured by the very slow passage of the filtrate. We found that the rate of flow was about five fluid ounces in half an hour, 13 fluid ounces in one hour, 19 fluid ounces in two hours, and about 10 pints in 20 hours.

NOVIO TOILET PAPER.

(THE PAPER CUTTING AND TOILET REQUISITE CO., LIMITED, CHADWICK WORKS, 26, GROVE-PARK, CAMBERWELL, LONDON, S.E.)

We found that the statements made in regard to the merits of this paper are correct. The paper at any rate is free from injurious or irritating substances, is smooth, and while firm becomes soft and apparently soluble like thin rice paper in contact with water.

SCOTCH WHISKY.

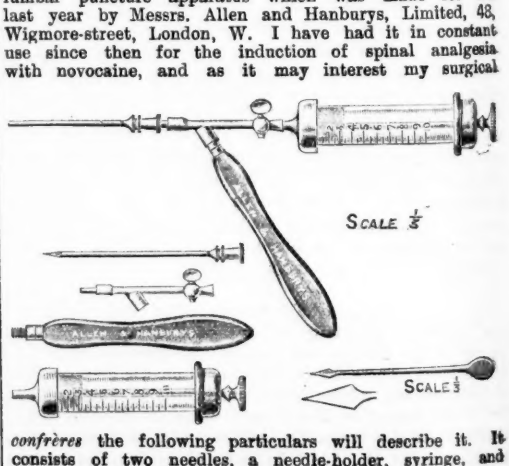
(JULIA HANSON AND SONS, LIMITED, TOWER-STREET, DUDLEY.)

There can be no question that this whisky is not only an all-malt spirit but one also that has been thoroughly matured. It is somewhat full in flavour but is nevertheless smooth and soft to the palate. The claim that it is relatively free from acidity is correct, a claim which has induced the vendors to call the spirit an "anti-gout and rheumatic whisky." In cases in which a stimulant is advisable or allowed by the medical man of course the purest and oldest should be employed, but the use of the expression "anti-gout and rheumatic" in the title of the spirit is objectionable. Our analysis gave the following results: alcohol, by weight 41·80 per cent., by volume 49·29 per cent., equal to proof spirit 86·37 per cent.; the volatile acidity amounted to 0·02 per cent. reckoned as acetic acid. The secondary products amounted in all to 421·54 grammes per hectolitre of alcohol present. This whisky is particularly rich in ethers, the amount being 158 grammes per hectolitre of alcohol. From this standpoint this whisky should serve for the same medicinal purposes as genuine old brandy.

# New Inventions.

## SPINAL ANALGESIA APPARATUS.

THE accompanying illustration gives a good idea of a lumbar puncture apparatus which was made for me last year by Messrs. Allen and Hanburys, Limited, 48, Wigmore-street, London, W. I have had it in constant use since then for the induction of spinal analgesia with novocaine, and as it may interest my surgical




*confrères* the following particulars will describe it. It consists of two needles, a needle-holder, syringe, and puncture knife. The needles, which measure three inches in length, are very fine ones (No. 17 and 18 gauge), composed of steel or platinum and iridium. I always use one of the latter, as it has the advantage over steel that it does not rust; but its disadvantages are that its edge is apt to get blunt more readily and the price is much more expensive. Their points are bevelled as near a right angle

as is consistent with their perforative power, for were they cut very obliquely it might happen that in some cases, when inserted through the membranes of the spinal canal, part of the aperture was in the subarachnoid space and part outside. Consequently, when the solution was injected analgesia would be absent or imperfect. The needle-holder consists of a hollow tube into which a removable handle, set obliquely, is screwed; one end fits into the socket of the needle, the other admits the nozzle of the syringe and has a stopcock interposed for shutting off the flow of cerebro-spinal fluid when required. The syringe has an improved glass barrel of ten cubic centimetres capacity, to which is adapted a very accurately fitting solid metal plunger, the nickel-plated metal mounts being soldered on to the glass barrel. There are no leather or other washers to get out of order. The puncture knife, which is diamond shaped, is used for penetrating the skin after it has been frozen with the spray of ethyl chloride. By this means two objects are attained: (1) it renders the procedure more aseptic, as the needle is not likely to become contaminated with micro-organisms from the skin; and (2) it prevents the point of the needle from becoming blunt by its passage through frozen tissues. The whole apparatus can be readily sterilised, but care must be taken first to place the apparatus in cold water, which is gradually boiled, otherwise the glass barrel of the syringe is liable to crack.

E. CANNY RYALL, F.R.C.S. Irel.
Harley-street, W.

## NEW SYDENHAM SOCIETY: A STRUGGLE FOR EXISTENCE.

THE following report will be made public at Exeter on Thursday, August 1st, and will not, we think, constitute very pleasant reading for those members of the medical profession who know the valuable work done by the society:—

### REPORT.

The works issued during the year 1906 consisted of two double fasciculi of the Clinical Atlas illustrating the subjects of variola, vaccinia, and varicella, and of a printed volume containing selected papers on the Parasites of Syphilis and Small-pox. For the current year a double fasciculus is already in the hands of the members and a second double fasciculus devoted to gynæcological subjects is almost ready for issue. The fasciculi of the Atlas, though fewer in number, are illustrated at greater cost than usual, since almost the whole of the plates are coloured. The treasurer's accounts have been audited and show that at the end of the year (December, 1906) there was a balance of £124 2*s*. 1*d*. but as two cheques amounting to £91 6*s*. had not been presented for payment the real balance amounted to £32 16*s*. 1*d*. Against this, however, were to be set off certain liabilities chiefly for work in progress. Part of this has since been discharged and the secretaries are of opinion that at the close of the present year it is not likely that more than £250 will remain due.

For several years past the treasurer and council have been unable to contemplate without some misgiving the financial position of the society. Too sanguine expectations were entertained during the first years of the issue of the Clinical Atlas and these led not only to the printing of an edition much larger than has been required but to a more liberal expenditure on plates and letterpress than could be afforded. It was anticipated that there would be a larger demand for the back fasciculi than has been realised. The nature of this work rendered it inevitable that the arrangements should be made well beforehand and obligations undertaken. The result was that for several years past the annual income has been to some extent burdened by debts incurred in former years as well as by some which were prospective. It was impossible to allot to each year its own share in expenditure and the auditors were repeatedly obliged to note that whilst the income and outgoings were balanced there remained some outstanding accounts with artists, &c. By careful management during the last two or three years this state of affairs has in part been rectified. No liabilities which could possibly be avoided have been incurred; the edition sent to press has been reduced, advertisements have been almost wholly stopped, the society's agent has accepted a smaller salary, and in every direction the strictest economy has been enforced. If the society were to cease receiving subscriptions at the end of the current year it would be free from engagements beyond the above-mentioned indebtedness of £250, which the realisation of its stock in hand should suffice to discharge.

At a meeting of the council held in December, 1906, when the above facts were fully discussed, a resolution was passed to the effect that it was desirable to submit to the annual meeting a proposal that the society should wind up its affairs. It was felt and expressed by several members of the council that the society had to a large extent completed its vocation. The activity of medical publishers of the present day is wholly different from that which prevailed when the society was instituted half a century ago. Publication under the auspices of a council, bound by rules which entail delay, and controlling only a limited annual income, cannot now compete with the energy and promptitude of individuals who are free to exert their own untrammelled judgment and to act promptly. The works left for the society's selection are now for the most part only those for which the publishers do not think there would be much demand; this applies especially to large printed books, but to some extent also to pictorial illustrations. For the production of the latter new and improved processes are constantly being produced of which a society having a work in current issue and unable to encounter pecuniary risk cannot well avail itself.

Six months have passed since the resolution just referred to was adopted and nothing during that time has transpired to induce those who know most about the details to change their views. For several years the loss of members by death or resignation has been in excess of its gains, and it is obvious that if, under closer financial pressure, the annual issue of books should be reduced the resignations would be likely to increase. It may seem to some almost a defect in courage or energy to contemplate the winding up of a society which yet numbers over 900 members and enjoys a corresponding income. It is true that such an income would suffice for a respectable annual issue of medical literature. The society at the present appears, however, to have no aims before it sufficiently definite and attractive to prevent further dwindling. The Atlas in its present form requires for success a very large income. It has been planned on too large a scale, and in endeavouring to meet the requirements of all it has disappointed many. It is clear that it must be either much modified or be discontinued. Nor does the council feel that there are any works suitable for translation the publication of which would be acceptable and likely to revive the society's former prosperity. In the circumstances which have been explained the society has determined to submit to the judgment of the annual meeting the subjoined proposals:—

1. That the society be continued on the understanding that the council will restrict itself to certain defined objects as follows: in the first place, the issue of an annual volume consisting of short monographs or essays carefully selected and translated promptly after their original publication; and in the second place, of one or more fasciculi of the Atlas, which should concern themselves chiefly with illustrations of the subjects dealt with in the printed volume or of those exhibited in the annual museum of the British Medical Association. Each fasciculus to be complete in itself.
2. That the society be continued, but its work be restricted to the translation and publication for series of foreign monographs or essays, the production of the Atlas or of expensive illustrations in any form being discontinued.
3. That the society be continued, its scope being left as heretofore to the judgment of the council for the time being.
4. That the society shall not be continued beyond the end of the current year. That the present officers be requested to be good enough to remain in office in order to wind up its affairs and be empowered to deal as may be thought best with the stock in hand and with any profits that may accrue from its sale.

At a large and influential meeting of the council held in London on July 18th it was decided to recommend the adoption of proposal No. 4 to the annual meeting, but it was also decided that in the event of this proposal not meeting with approval the alternative proposals 1, 2, and 3 be put before the members.

INTERNATIONAL CONGRESS AGAINST ALCOHOLISM.—The president and the honorary secretary (*pro tem.*) of the National Temperance League have communicated to the *Times* a resolution recently arrived at by prominent British representatives of temperance organisations to invite this congress to meet in London in the year 1909. The Duke of Connaught has consented to act as honorary president of the congress in the event of the invitation being accepted, and among those who have agreed to act as vice-presidents are the Archbishop of Canterbury, Lord Alverstone, Lord Kinnaird, Mr. John Burns, Sir George Livesey, Sir Victor Horsley, and Professor G. Sims Woodhead.

# THE LANCET.

*LONDON: SATURDAY, JULY 27, 1907.*


## The School in Relation to the Health of the Nation.

IT is no extravagant statement to assert that with the advent of the general medical inspection of school children and the teaching of the elementary laws of health to the older children a new dawn is breaking in the evolution of preventive medicine; indeed, hitherto the scope of preventive medicine, limited as it has been to a few only of the acutely infectious diseases, has been altogether too contracted. There are few diseases which are not preventable at least in some degree, more especially if they can be recognised early in their course. Of all preventable conditions which are likely to respond to well-directed educational efforts infantile mortality is by far the most important and most promising, inasmuch as its reduction is very largely a matter of education. There are, indeed, indications that it is only by the knowledge which will follow in the wake of medical inspection and the teaching of hygiene that any substantial reduction can be made in the volume of that great river of mortality which in certain areas of our large towns bears away some 200 of every 1000 children before the first anniversary of their birthday. The full harvest of such inspection and education will not be reaped for many years, not, indeed, until the health conscience which should become developed has resulted in a fitter and fuller motherhood than at present obtains and a knowledge of the factors which make for health and fitness has become appreciated and acted upon. At present we concern ourselves but little with future generations, and there is force in HERBERT SPENCER'S scathing criticism that if the earth were suddenly to become uninhabited and it could be visited a few years hence by people from another planet, Mars perchance, they would on examining our books conclude that, although we wrote on multitudinous subjects, we were clearly a sterile people, since nowhere was there to be found in our books for the young any indication that they were ever expected to become fathers or mothers. It is a strange commentary upon this satire on the part of the prince of philosophers that it is only when a stationary condition of our population is actually threatened by a steadily diminishing birth-rate and an excessive infantile mortality that we are awakening to the desirability of educating and improving the physique of future mothers and fathers. Already there are signs that the medical inspection which is taking place is resulting in a marked improvement in that first essential of health, the cleanliness of the children, and the defects which are being detected in the physical condition of the children hold out promise that many of such defects are preventable or at any rate amenable to great diminution.

The degree of progress which is likely to ensue in consequence of a general scheme of medical inspection and education depends in a paramount degree upon the medical profession as a whole. It is the general practitioner who must be responsible for the treatment of the defective condition of the children revealed by medical inspection. The systematic adoption of the inspection of school children means that there is to be a great searching out of diseased and defective conditions, many of which without such inspection might never be brought to light and consequently never treated. It means that in one capacity or another there will be much more work for medical men to do, and the amount of such work should increase *pari passu* with progress in our diagnostic methods, such, for instance, as is being made in the detection of the early signs of pulmonary tuberculosis. Already medical officers of health when opportunities have offered have organised inspections which have shown clearly what an enormous wastage of physical fitness is taking place and what a large number of children there are who start on the race of life with an unnecessary handicap by virtue of some removeable or remediable defects and who must soon succumb and become dependent upon relatives or the State for maintenance. We are likely to hear much of all this at the forthcoming Congress on School Hygiene which will meet in London early in the coming month, and it is to be hoped that out of that congress there will be crystallised some systematic scheme for dealing with the whole question of the medical inspection of school children and the teaching of elementary hygiene in a fashion easy of comprehension. It appears to us that in so far as local organisation is concerned the interests of economy and efficiency point to the medical officer of health. Several of the more important towns have now in operation a scheme of medical inspection under the administrative control of the medical officer of health, and in our view such control, at least in large urban districts, should be left or placed in his hands. As regards purely rural districts the matter is more complicated, any advantage there would be in intrusting the control to the county medical officer of health being counter balanced by the more intimate personal knowledge that would be possessed by the general practitioner. This is a difficult point which we commend to the deliberations of our readers.

The Inter-Departmental Committee on Medical Inspection of School Children thought that there were obvious advantages in the medical officer to the education authority being also medical officer of health. The duties of the two offices naturally overlap as, for example, in the inspection of school children with a view to prevent the spread of infectious disease, and in supervising the sanitary condition of the schools. Supervision in this sense cannot be removed from the medical officer of health who must also be in frequent communication with the teachers as regards suspicious illness amongst absentees, and who has, or should have, at his disposal means for bacteriological examination as well as for improving the home conditions of the children. The question of the treatment of defective and diseased children discovered by the medical examination is a difficult one. So far no treatment other than that occasionally

directed to very minor ailments has been attempted by the education authority, as it is very generally agreed that "to treat the ailment discovered would tend to pauperise the parent." The Committee on Physical Deterioration thought that "in no instance should the inspector do more than state the facts that require the attention of the parent, cases of poverty and neglect being left to the proper authorities to deal with." The Committee on Medical Inspection expressed the opinion that if the children were treated as well as examined the cost would be very materially increased and that medical practitioners would have ground for complaint, more especially in those numerous instances where the school medical officer would also be in private practice. For our part, we agree that the education authority should content itself with informing the parents of the actual conditions observed, leaving them to arrange for treatment in the usual fashion. It is by this means that the cordial coöperation of the medical profession throughout the country will be best insured and that the maximum benefit from the medical inspection of children is likely to result. The medical profession itself has a delicate task before it in so far as the actual inspection of the school children is concerned, but we feel sure that the high ideals which have always animated professional conduct will enable whatever reasonable project is devised to be carried out in the interests of the children.

## The Duties of Certifying Surgeons under the Workmen's Compensation Act, 1906.

ON another page a letter is published from a certifying surgeon under the Factory and Workshop Act, 1901, who has received from the Home Office documents designed to supply him with information as to the fresh duties assigned to him and to those holding similar appointments by the Workmen's Compensation Act, 1906. The last-named statute has probably attracted more general attention than any recent piece of domestic legislation, not even excluding the Education Act passed by the late Government, owing to the inclusion of the enormous class of domestic servants in its provisions, a class not likely to have recourse with any great frequency to its assistance. Innovations of more genuine importance to those sought to be benefited and to those charged with carrying the new law into effect are those which assign compensation for personal disablement to workers who have always been liable to be disabled, either through their own fault or the neglect of their employers, or perhaps from a combination of the two causes, but who hitherto have had to accept the risks of their employment and to bear unaided any resultant injuries. The inclusion of industrial diseases and the incapacity arising from them, so that these are reckoned as if they were personal injuries by accident arising out of, and in the course of, the workman's employment, adds to the duty of the employer to protect his workman by guarding against any such disease the liability to compensate him if, in spite of or in the absence of precautions, he should contract it. The duty of investigating the alleged occurrence of industrial disease has been assigned to medical men specially appointed under the Factory and Workshop Act, 1901, and known as certifying surgeons, chiefly on account of the certificates which they are called upon to grant as the result of the medical examination of juvenile candidates for employment. These gentlemen receive notice of all accidents of a specified character in factories and workshops and of the occurrence of certain industrial diseases mentioned in the Factory and Workshop Act, 1901, to which the Home Secretary has power to add by Special Order, and it is their duty to investigate such cases and to report upon them. Not unnaturally, therefore, in order to secure accurate evidence in connexion with the industrial diseases which are to rank as accidents under the Workmen's Compensation Act, 1906, fresh duties have been imposed upon the certifying surgeons on account of the position which they already occupy and of their familiarity with the subjects to be dealt with. The defining of the procedure to be adopted under the new Act has involved a certain amount of reference to that already prescribed by the Factory and Workshop Act, and the combination of two statutes with their accompanying regulations is likely to afford to certifying surgeons a certain amount of subject matter for careful study.

We do not anticipate that as the result of such study the fears expressed by our correspondent already alluded to will be found to be justified, or that the duties which add new importance to the responsible post of certifying surgeon are as wholly unrewarded as they would be if the personal examination, followed by certification, of a man suffering from a possibly obscure and complicated disease were to entitle the medical man to a fee of 1*s.* only. The circular to which our correspondent refers dwells, it is true, on the necessity for care in filling up the required certificate, the fee for which is in certain circumstances 1*s.* Reference, however, to the regulations which accompany the circular shows that when the fee is limited to 1*s.* it is for the giving of a certificate only, the material for which has been obtained through an examination paid for as such. The fee, in short, is fixed at 1*s.* where the medical examination of the workman has to be made by the certifying surgeon under the Factory and Workshop Act, 1901, or under the special rules or regulations of the Home Office for the carrying out of that Act. The rule which relates to cases not under the Factory and Workshop Act provides "in all other cases a fee of 5*s.*, and where the workman is unable to present himself for examination at the residence of, or other nearer place fixed by the certifying surgeon, for every mile or portion thereof which the certifying surgeon is required to travel therefrom for the purpose of examining the workmen an additional fee of 1*s.*" These are fees to be paid by a workman seeking to establish that he is suffering from a disease contracted in such circumstances as to render him a subject for compensation. There is provision under the Act and under the rules made by the Home Secretary to meet the case of an employer who may seek for a certificate that the disease contracted by the workman is not due to the nature of the employment so as to render his master liable; for this certificate the fee is fixed at 2*s.* 6*d.*, but presumably such a certificate will only be wanted when a workman has already been examined and the examination paid for by him in the endeavour to establish the liability of the employer.

It is to be observed also that a copy of any certificate must on payment of the prescribed fee be given to an employer or a workman by the certifying surgeon, and for such a copy a fee of 1s. is to be paid. The regulations made under such Acts as the Workmen's Compensation Act and the Act itself, where they have to be read in combination with the Factory and Workshop Act, may seem a little complicated but will become comparatively clear to those for whose guidance they have been framed as soon as they have had occasion to apply them to a few actual cases.

## Trypsin in the Treatment of Cancer.

THE number of remedies which have been brought forward for the cure of malignant disease is very great and the hopes of the public, and also of the medical profession, are raised from time to time by some new discovery or by the employment of some well-known drug; but experience has always shown that the much vaunted remedy cannot accomplish that for which it has been given and a feeling almost of hopelessness arises. We have so often been deceived by promises that have not been fulfilled that we cannot but view with a certain amount of doubt any new claim. This hesitation in accepting the claims of those who say that they have cured cancers by other than surgical treatment must be beneficial, for it leads to the thorough testing of new remedies. At the Middlesex Hospital it is a definite part of the work of the cancer department to test all new "remedies" for malignant disease and the tests are applied with absolute impartiality, no treatment being condemned as useless until it has been shown definitely to be of no value. In a daily newspaper recently the writer of an article on the use of trypsin in the treatment of cancer complains that "there have been a large number of imperfect trials which have resulted in failure and which have been seized upon by those who are constitutionally incapable of appreciating anything new and by those who have had even less creditable motives for their attitude." It is difficult to guess to whom the writer refers in the latter part of his paragraph, for everyone would welcome with open arms the advent of a genuine remedy for cancer, and none would welcome it more than members of the medical profession for they see more of the pain, the discomfort, and the misery resulting from malignant disease than does any other section of the populace. But medical men also know more of the failures of the remedies proposed for cancer; the apparent successes readily find their way into print, but the many certain failures are much less likely to be recorded.

How does it happen that credit has been given to many substances as remedies for malignant disease while subsequent trial has shown that they are useless? Whenever we find very many substances offered as remedies for the treatment of any morbid condition we may be sure that one or more of the following circumstances are present. The disease may have a natural tendency to abate, whether any treatment be adopted or not; when this is so, the last treatment employed is likely to have the credit of the improvement. Or there may be natural fluctuations in the rate of progress of the malady; any remedy that coincides with a temporary arrest of its progress will have ascribed to it that arrest, even though there may be no connexion between the two. And lastly, a fruitful source of undeserved reputations of drugs in the treatment of obstinate diseases is to be found in errors of diagnosis. In the history of the drug treatment of cancer we can find many instances of the last two of these fallacies. All who have had many opportunities of studying clinically malignant disease have recognised the wonderful variations which occur, and not merely in different cases, though that is very striking. In one patient a cancer of the breast may grow with great rapidity and a few months from the earliest sign may see the fatal result, and in another patient a growth of the breast, equally cancerous, may last some ten, 15, or even 20 years, and, in fact, the patient may die from some intercurrent malady and not from the malignant growth. These differences occur in different persons, but very similar variations may, and often do, occur in one and the same patient. At times a cancer may progress rapidly; in a few weeks or months a small nodule may attain huge dimensions and cause much pain and then without any obvious change in the circumstances, without any modification of diet, drugs, or mode of life, in fact, without any apparent cause, the rapidly growing mass may suddenly cease to enlarge; or it may shrink and all pain may be absent, and for a time this cessation of growth may last, and then after a longer or shorter interval the tumour may again take on active growth and rapidly lead to a fatal issue. Sometimes the slackening of the progress of the cancer may be permanent; years may pass by and but little change be observed. Nay, more, the halt in the increase of the malignant growth may be followed by very sensible diminution in the size of the tumour and this diminution may continue until what at one time was an enormous mass may have dwindled until only a small nodule remains and cases have even been recorded where a growth has absolutely disappeared. And in some of these cases there can be no question of a mistake in diagnosis, for there are cases of cancer of the breast in which surgical removal of the growth has been followed by recurrence; histological examination of the original mass has settled beyond question the malignant nature of the tumour and yet the recurrent nodules have disappeared completely. Should any of these ameliorations of the signs and symptoms of a cancer have coincided with the administration of Chian turpentine or extract of violet leaves or any other belauded remedy then it is only natural that the drug employed should be credited with the improvement that has occurred, and it cannot be doubted by any careful observer of cases of malignant disease that this explanation is true of the reputation that has been gained by many substances.

There is, however, an even more potent source of error in this matter, and that is faulty diagnosis. It sometimes happens that, even when a growth has been removed and has been examined by the naked eye and microscopically, it has not been possible to say with absolute certainty whether it is malignant or not, and if this be so when we can examine a tumour with all the resources at our command how is it possible always to guarantee the malignancy of a growth in the living body? It must be allowed by all who are conversant, clinically and histologically, with the subject that this liability to error in diagnosis is very great, and if it is great with those who

have abundant opportunities of studying carefully malignant disease how much greater is it with those who are untrained? With many "cancer curers" any swelling is a cancer, and even with those who have no motive for miscalling a simple growth or an inflammatory swelling the word cancer is used with a freedom unjustified by the course of the disease. When, therefore, a new remedy that is claimed to be a remedy for cancer is introduced there is a natural feeling of doubt that the introducers of it have been hasty in bringing it forward, and not until it has been tested and re-tested can it be admitted as a trustworthy treatment.

One of the recent cancer "cures" that has received more public notice than is usually accorded to new remedies is trypsin. The history of its introduction is of itself interesting. In 1902 Mr. J. BEARD, a Doctor of Science of Victoria University and University lecturer in comparative embryology, Edinburgh, first propounded the theory that malignant growths are nothing more than the result of the development of vagrant irresponsible germ cells. This theory must not be confused with COHNHEIM'S suggestion that tumours may develop from embryonic "rests," for these would consist of somatic cells. Dr. BEARD further maintains that the majority of unutilised germ cells or trophoblasts are destroyed in the normal development of an embryo about the time that the pancreas commences its functional activities. He holds that the trophoblast nourishes itself by an acid intracellular digestion and that when the stronger alkaline enzyme of the pancreas appears on the scene it is able to overcome the intracellular enzyme of the trophoblast and therefore brings to an end the growth of the trophoblast. The deduction from these theories jumps to the eyes. If in the normal development of the body the trophoblasts are destroyed by the pancreatic ferments, and if cancer is only the result of the persistence of a trophoblast, then the introduction of pancreatic ferments should lead to the destruction of the cancer. Each of these "ifs" is rather large, but granting the premisses we can hardly refuse the conclusion. It is, to say the least, curious that the utilisation of pancreatic ferments should have suggested itself to other observers and for entirely different reasons. There is an excess of glycogen in the active cells of carcinomata, as in all rapidly growing tissue. Dr. J. A. SHAW-MACKENZIE has suggested that this excess of glycogen in cancers is due to insufficiency of the pancreas and naturally he came to the conclusion that it would be well to try the action of pancreatic ferments in malignant disease. Similarly Dr. R. ODIER of Geneva has advised a mixture of the extracts of the pancreas, the liver, and muscle in the treatment of cancer. So far theory only has spoken but Dr. BEARD proceeded to test his theory by the injection of trypsin into some mice which had been inoculated with Jensen's mouse tumour. Two were inoculated and others were kept as controls. Of the two inoculated mice, one died from an accident ten days after the commencement of the injections and its tumour was only half as large as those in the controls, while the second inoculated mouse was killed after three weeks' treatment and the tumour was very much reduced in size; in both the injected cases there was a uniform degeneration of all the cancer cells. It must not be forgotten that even in untreated cases of carcinoma very similar changes occur in the cells, and as to the diminution in size of the tumours some untreated cases of Jensen's tumour show as much decrease. With these observations we may reasonably compare those obtained by the Imperial Cancer Research Fund, in the annual report of which body the general superintendent states that trypsin has been carefully tested on mice with rapidly growing Jensen's tumours, that a large number of observations have been made, and that it has been proved that the treatment "is incapable of curing mice of inoculated cancer or of influencing the progressive growth of tumours."

We come now to consider the employment of the treatment in human beings. Many failures have been met with but we may mention that some of the unsuccessful cases appear to have been treated with solutions containing no trypsin, while sometimes the ferment has been destroyed by the employment of a syringe too soon after it has been sterilised by heat, but more recently these fallacies have been guarded against. Dr. C. C. RICE of New York reported in November, 1906, that he had treated four cases with trypsin; in three no marked change occurred, but in one, a case of laryngeal carcinoma, complete recovery resulted in two and a half months. Clinically it is said that there was no doubt as to the diagnosis but no microscopic examination was made. The cases which chiefly attracted attention in this country were those treated by Dr. W. J. MORTON of New York. He had 29 patients under trypsin treatment and public attention was drawn to these cases by articles in the London daily press. Depending only on a telegraphic summary of Dr. MORTON'S paper which appeared in the *Medical Record* of Dec. 8th, 1906, one or two newspapers published highly exciting articles on this "new cure for cancer." We are willing to concede to the authors and publishers of these articles a sincere desire to benefit suffering humanity; but their zeal was without discretion and their pathological knowledge superficial, and it is certain that many hopes were raised only to be dashed to the ground. If before these writers had entered on a campaign they had waited for fuller details they would have learned that the "cures" were more than doubtful. The most remarkable of Dr. MORTON'S cases was one with an extensive carcinoma of the breast. It was said that a most remarkable atrophy of an entire cancerous breast had occurred, but when the fuller particulars arrived we learned in the first place that the tumour had been treated not only with injections of trypsin but also with x rays, and then the "fibrous mass" which remained was removed surgically. When a microscopic examination was made of the removed mass degeneration of the cancer cells with increase of connective tissue was found in the central part, but towards the edge the cells were evidently living and growing; in fact, the growth showed the typical appearance of scirrhous carcinoma. It will thus be seen that this case is worthless as any evidence of the curative power of trypsin. Of the remaining 28 cases treated by Dr. MORTON five have died under treatment, in five no change was apparent, and in 18 there was said to be some improvement. No further details have reached us on this point. Two of the patients with "epithelioma of the face" were said to be cured but we

have not sufficient data to be certain of the correctness of the diagnosis.

At the Middlesex Hospital trypsin has been tried; in the first two cases there was no improvement in the patients nor was the progress of the growth influenced by the injections; but it may be objected that in these cases the preparation of trypsin may not have been potent, so later a fresh supply of the drug was obtained and each ampoule of injection was tested for digestive power. The injections were used on nine cases; in three of these treatment was employed for little more than three weeks and therefore they may perhaps be put aside. In the remaining six cases the treatment lasted from 66 days to 118 days. Of the six, two succumbed, one was sinking fast at the time of the last note, and three were still living. In two of those still living at the time of the report the weight had decreased; in the third it was stationary. The evidence of improvement in the six cases was as follows: in one there was distinctly less pain, in one there was a diminution of the stenosis of the rectum, and in one the disease was stationary. The treatment did not prevent most of the patients from showing a progressive loss of weight and except in one case no local improvement occurred. We have no wish to condemn the trypsin treatment; we have heard of cases where improvement appeared to have resulted from the trypsin injections. We have heard also of cases where no benefit occurred. When the treatment has been tested systematically both on mice and men it seems to have failed completely, and it is only by a thorough trial that we can come to a correct conclusion as to its value. No one will rejoice more than we shall should the treatment eventually prove of value, but hitherto we have seen no certain evidence of that value.

# Annotations.

"Ne quid nimis."

## THE NEW COURT APPOINTMENTS.

THE King has been pleased to appoint Sir Richard Douglas Powell to be one of the physicians-in-ordinary to His Majesty in the room of Sir William Broadbent, deceased. Dr. Bertrand Dawson, physician to the London Hospital, has been appointed one of the physicians extraordinary. The King has also been pleased to appoint Sir Thomas McCall Anderson to be one of His Majesty's honorary physicians in Scotland in the room of Sir William Gairdner, deceased. In the notice of these Court appointments, as it appeared in the *Gazette* on Friday last, July 19th, the name of Sir Thomas Fraser, also one of His Majesty's honorary physicians in Scotland, was substituted for that of Sir William Gairdner, with the result that many questions were directed to us as to how and when and where the well-known professor of clinical medicine in the University of Edinburgh had met his death. We were happy to be able to assure inquirers that he was, in his own words, "very much alive."

## THE DESTINY OF CASE-BOOKS.

THE destiny of old case-books and notes of cases is one which concerns medical men and the public alike. What, as a rule, becomes of a medical man's written records of his patient's ailments? Generally speaking, these highly interesting and often compromising documents are handed on by each medical man to his successor in a practice, but where there is no such succession—what then? As a rule, when a learned man dies, unsympathetic legatees regard his books and papers with scant favour. Sometimes, on the part of a practical widow and her daughters, there occurs a great burning of "dear papa's old rubbish," but at other times there is a scattering to the four winds of heaven of documents that it would have been best to burn. This scattering is not necessarily rapid; it may last years and its final result may be that the most private memoranda have become matter of public comment by the literary pickers-up of unconsidered trifles. Medical men should, of course, make a point of leaving their case-books and other memoranda in safe hands, and this can be done either by will or on retirement from practice. Sir Astley Cooper's elaborate accounts of cases are now in a special or reserved collection in the library of the Royal College of Surgeons of England. This is as it should be. As the great surgeon always mentioned the names of patients and as those names are still mostly well known in England to-day, it is alarming to reflect what would have happened had his very circumstantial records of ancestral complaints fallen into the hands of nervous moderns to-day. But this might have, and has in other cases perhaps sometimes, happened.

## THE PUBLIC TELEPHONE CALL OFFICE AS A FACTOR IN THE SPREAD OF DISEASE.

IT would be interesting to know the bacteriology of the air of public telephone call offices. The suggestion should stimulate the curiosity of the scientific staff of the London County Council, many of the inquiries of which have proved the insanitary conditions of many places in the light of bacteriological research. The public telephone call office appears to be singularly well designed for the capture and growth of pathogenic organisms. These little stations are usually carefully closed, are padded, and kept almost air tight; sunshine and fresh air seldom can reach the interior, while of course no attempt is made to keep them aired or ventilated, because any provision for securing ventilation is calculated to make difficult the hearing of the message. External sounds must be kept out, the box must be sealed against them, and when this plan succeeds it must succeed also in excluding with equal efficacy external purifying agencies. The telephone call station may be described, in fact, as a bacteriological box in which pathogenic and other organisms are carefully nursed. Infection of the imprisoned air must at all events be constantly taking place and this only too readily spreads whenever the opportunity arises. Caller after caller thus either may infect or receive infection so long as no steps are taken to purify the air within the station. It is a common experience of those who have occasion to use these call offices that unless the padded door which when closed is tight-fitting is left wide open (a plan which is not encouraged) the air within is frowsy, stale, and often has an offensive odour. Common sense appeals against this state of things and it would be safe to predict that the bacteriological examination of this air would tell an appalling story. Surely it would be simple enough to attach a system of ventilation to these call boxes which would not interfere with the articulation of the transmitting disc or prevent the message from being heard. The interior should be air-swept regularly or automatically and disinfected. We have heard of the septic condition of the receiver or tube into which the operator delivers his message and we know that it has been clearly demonstrated by scientific experiment that in the act of speaking *materies morbi* may be projected from the speaker's mouth for a considerable distance. With reasonable care such a risk of infection can be minimised, but the polluted air of the

telephone box can scarcely be avoided. Many persons using the telephone speak needlessly near to the receiver. The message at the other end is no clearer for this and is often unintelligible in these circumstances. A message well delivered with words properly and concisely pronounced is faithfully recorded, even though it is spoken quite away from the receiver. The contamination of the receiver when it exists may therefore be avoided to a very great extent, but the air of the telephone call box is difficult to avoid and yet it must contain a whole menagerie of organisms, some of them without doubt pathogenic, and it should be the duty of the telephone authorities to protect their customers from the possibility of contracting disease in this way by providing for a constant renewal of the air and by keeping the station bacteriologically clean by the use of an efficient disinfectant.

## BREAKFAST FOODS.

THE recent work of Professor Robert Harcourt on the food values of advertised "breakfast foods," which formed the subject of an annotation in our issue of May 4th, p. 1240, has been amply corroborated by the publication of the results of the analysis of 99 samples of various "breakfast foods" by Mr. J. G. A. Valin, in the laboratory of the Inland Revenue Department, Ottawa, Canada. Mr. Thomas Macfarlane, the chief chemist of that department, in issuing the report defines a "breakfast food" as consisting of a cereal which has been subjected to a certain amount of preparation or cooking, with or without the addition of some other food material. Determinations were made of the proteids, moisture, and fat. In a previous bulletin (No. 127) it was shown that rolled oats which have had no previous cooking never yield more than 3 per cent. of dextrin. Of the foods examined, only Beaver oats, Quaker oats, Saxon oats, and Pilson's oats appear to be made from oats, as judged by the percentage of fat present. The figures obtained by the analysis of rolled oats and of porridge made from the same afford a useful guide to the values of these foods. The figures are calculated on the dry substance :—

| | Total proteids. | Fat. | Sugars and soluble proteids. | Dextrin. | Starch. |
|---|---|---|---|---|---|
| Rolled oats ... ... ... ... | 13·76 | 5·19 | 4·13 | 2·32 | 71·21 |
| Porridge made without salt | 18·72 | 0·55 | 0·34 | 7·62 | 67·41 |
| " " with " | 17·60 | 1·17 | 6·69 | 13·97 | 53·98 |

If the analyses of the four advertised varieties of prepared oats above mentioned are calculated on their dry substance the resulting figures show that they contain less than half the amount of dextrin present in porridge prepared by the old-fashioned way. The figures here recorded show that the method of cooking oatmeal without salt is a very ineffective way of predigesting the starch which it contains. Porridge cooked with salt contains twice as much soluble dextrin as porridge cooked without salt. Another fact which is brought out by these tests is that the fat seems to disappear during the cooking. It is possible that it may enter into some sort of combination with the proteids so as to render it incapable of removal by the usual solvents. It has been shown by Dr. Chamberlain of Washington that the fat of wheaten flour undergoes such a change in the process of baking bread. It is important to note that, calculating on the dry substance, bread contains from 13 to 16·76 per cent. of substances soluble in water after extraction by alcohol, representing an amount of dextrin far greater than that contained in most of the "breakfast foods" examined. It follows from this investigation that the claims as to "predigestion" made for advertised foods are often exaggerated. Porridge made with a suitable quantity of salt is vastly superior to most of them in this respect. As regards the processes of "rolling" and "flaking" the grains it is quite possible that the thinning out of the material increases the digestibility but it is questionable whether the advantage is worth the extra cost. "Breakfast foods" are usually sold in packages of varying weight, a fact which renders a strict comparison of prices impossible, but the price of these foods appears to vary from 5 to 23 cents per pound, whereas oatmeal or wheaten flour is retailed in Canada at from 3 to 4 cents per pound. In conclusion, reference may be made to the extravagant phraseology of the claims made for many of these foods. The language is similar to that employed by the manufacturers of quack medicine. We quote a few instances in illustration of this: "The natural food for creating power"; "Concentrated malted food; ready to eat. Pure, predigested, thoroughly cooked"; "A food for brain and nerve centres"; "Grain combined with vegetable or plant iron"; and "The natural food for creating power, repairing waste, maintaining energy."

## CATS AS A PREVENTIVE OF PLAGUE.

SINCE Lieutenant-Colonel A. Buchanan, I.M.S., wrote in May last drawing attention to the value of the domestic cat as a preventive against plague and insisting on the fact that as the animal enjoys the unique distinction of being held sacred by Hindus and Mahomedans alike it would be difficult for even native suspicion to suggest sinister motives to Government in encouraging its breeding and maintenance, there have been several communications to the same effect in the Indian press the writers of which were apparently unaware that the subject had already been broached by Lieutenant-Colonel Buchanan. Writing to the *Pioneer* from Cherat on June 4th Major O. R. A. Julian, R.A.M.C., after deploring the want of success which has attended upon all efforts to deal with plague on scientific grounds, proposes that good healthy cats should be brought in small consignments and protected while breeding until they were sufficiently numerous for distribution. Then to encourage the natives prizes should be offered in each village, one for the finest cat and another for the best ratter. "I venture to think," continues Major Julian, "that the sporting or gambling instinct of the native would be appealed to and that he would probably turn up not only with his cat but with a bag of rats for the contest, and the extermination of rats would be an event of the near future and with them the plague." On June 15th Assistant-Surgeon S. M. Pavri wrote as follows to the *Times of India*: "The rat-flea-man theory being scientifically established, the desirability that every house should be without a rat is the burning question of the day. But so many and so varied are the religious superstitions and social prejudices among the peoples of India against this destruction of rats, and so wonderfully prolific is the rat itself, that how to achieve this end on the line of least resistance does, and I am afraid will, remain a moot point. ..... Under these circumstances may I venture to suggest a remedy which does not seem to have attracted the attention it deserves? I mean a rat-killing campaign by cats." Assistant-Surgeon Pavri then proceeds to argue that the getting rid of rats by means of their natural enemies is not calculated to arouse opposition or discontent on the part of "the sensible masses who will not reject the bargain when it is a question of life and death to them and their families." Under the head of "Notes and News" in the *Journal of Tropical Medicine and Hygiene* dated July 1st it is stated that "Lieutenant-Colonel Buchanan took a cat census of certain villages that enjoyed exceptional immunity from plague and of others that had been severely handled by the disease." The result showed that the immune communities harboured large numbers of cats, whereas in those that suffered the animals were scarce. Our contemporary is of opinion that "the expedient is one that is certainly worthy of attention, though it is difficult to see how the

keeping of cats can be spread more widely by official action." The circulation of pamphlets in the vernacular is recommended, as "the native is by no means impervious to appeals of common sense." We quite agree with this but we are also of opinion that Major Julian's suggestion might well receive official encouragement.

## THE BACTERIOLOGICAL EXAMINATION OF THE BLOOD IN TYPHOID FEVER.

IN recent years the value of bacteriological examination of the blood in the diagnosis of typhoid fever has become more and more appreciated. It has become a routine practice in some hospitals and has been found to be successful at an earlier stage than has Widal's test. The *American Journal of the Medical Sciences* for June contains an important paper on the subject by Dr. W. Coleman and Dr. R. H. Buxton. During the last six years they have bacteriologically examined the blood in 123 cases of typhoid fever and found the bacillus in 75 per cent. They draw 10 cubic centimetres of blood from a vein at the bend of the elbow and, following Conradi, they have abandoned broth and used ox gall as culture material with better results. A mixture is made of 90 cubic centimetres of ox bile, 10 cubic centimetres of peptone glycerine, and two grammes of peptone and is distributed into flasks in portions of 20 cubic centimetres and sterilised. Three flasks are used for an examination and about three cubic centimetres of blood are run into each. The flasks are incubated and on the following morning streaks are made from each over the surface of a litmus-lactose-agar plate. If microbes are present a growth may be observed in five or six hours. If the growth does not redden the medium and is found to be a bacillus resembling the typhoid organism it is tested for the Widal reaction with immune serum. Thus typhoid fever can often be diagnosed within 24 hours of drawing the blood. Dr. Coleman and Dr. Buxton have used this method in 34 cases. As a rule the blood was examined when a patient with fever for which there was no obvious cause was admitted to hospital. Six of the cases were ultimately found not to be examples of typhoid fever. Three ran the clinical course of typhoid fever but gave neither a blood culture nor the Widal reaction. In one case there was a difference of opinion as to the diagnosis. The remaining 24 cases were clinically typhoid fever and in all positive results were obtained by bacteriological examination of the blood. In cases of long duration examinations were made from the fifth to the twenty-first day of the disease. Previously 1602 cases of bacteriological examination of the blood in typhoid fever had been recorded. Of these 1197 (75 per cent.) gave a positive result. Of 224 examinations in the first week of the disease 89 per cent. were positive. The earliest positive result was obtained on the second day of the disease by Widal's test. Positive results become more frequent as the end of the first week is approached. Of 484 examinations in the second week 353 (73 per cent.) were positive. Of 268 examinations in the third week 178 (60 per cent.) were positive. Of 103 examinations in the fourth week 39 (38 per cent.) were positive. Of 58 examinations made after the fourth week 15 (26 per cent.) were positive. Some observers have obtained positive results from bacteriological examination of the blood in typhoid fever in 100 per cent. of the cases. Dr. Coleman and Dr. Buxton have obtained similar results since they adopted the bile-culture method. Hence they conclude that the bacillus is present in the blood in every case of typhoid fever and that failure to find it is due to defective technique. The diminishing percentages in the later weeks of the disease do not indicate that the bacillus has disappeared from the blood in the negative cases but point to diminishing numbers of bacilli which imperfect methods have failed to reveal. The bacillus appears to disappear about the time when the temperature falls to normal. This constant presence of the bacillus in the blood in typhoid fever modifies our conception of the pathology of the disease. It has been shown that the bacillus may flourish in the intestines of healthy persons who show no signs of the disease. Therefore, to produce typhoid fever the bacillus must grow in a situation whence it has free access to the blood. As the lymphatic glands and spleen contain enormous numbers of bacilli Dr. Coleman and Dr. Buxton suggest that the bacillus first finds its way from the alimentary canal to the lymphopoietic system where it develops chiefly and that thence it invades the blood stream. They think it doubtful whether it multiplies in the blood. According to this view its presence does not indicate a true septicæmia.

## THE UNITED SERVICES MEDICAL SOCIETY.

THE first meeting of the council of the newly formed United Services Medical Society was held on May 30th. It was decided that meetings should be held at the Royal Army Medical College at 8.30 P.M. on the second Thursday in each month commencing on Oct. 10th next; that the annual subscription should be 5*s*. payable in advance; and that a notification of the formation of the society, accompanied by an invitation to join, should be sent to all medical officers on the active lists and to those on the retired lists whose addresses could be discovered. Should any medical officer on the active or retired lists of the navy, the British and Indian armies, or the auxiliary and colonial forces not receive an invitation the council hopes that, if desirous of joining the society, he will communicate with one of the honorary secretaries, Fleet-Surgeon W. W. Pryn, R.N., "Tredown," 25, Idmiston-road, West Norwood, London, S.E., or Lieutenant-Colonel C. H. Melville, R.A.M.C., Royal United Service Institution, Whitehall, London, S.W.

## "SALTED PLAGUE VACCINE."

AT a summer meeting of the Bombay Medical and Physical Society Dr. R. Row described some peculiar physical and chemical characters presented by bacillus pestis when grown at a temperature of 40° or 41° C. or in symbiosis with staphylococci. A plague culture grown under these conditions is sticky and glutinous, so that it is with difficulty scraped off the agar surface on which it is grown; but when it has been dislodged from its bed the whole culture can be easily gathered up on the platinum loop in the form of a bead owing to the gummy and cohesive nature of the mass. This sticky character of bacillus pestis grown at 40° or 41° C. contrasts strongly with that of a bacillus grown at the room temperature of 25° or 28° C. The cause of the difference in the two classes of cultures is that the growth at low temperatures is rich in chromatophile endoplasm with hardly any ectoplasm or "capsule," while that grown at higher temperatures is rich in the ectoplasm or capsule, the chromatophile granules being found only in small traces. This character of stickiness is also an index of the virulence of the culture, being present only in those of high virulence and absent in those of low virulence. A sticky plague culture when taken up in sterile water and allowed to stand for several days yields a uniformly opalescent fluid consisting of a sort of suspension or emulsion of the glutinous material entangling a few bodies of the plague bacilli. On addition of chloride of sodium even in excess to an emulsion of a sticky culture no precipitate is obtained until after several weeks' standing. This salted emulsion, therefore, not only gives a fluid rich in protein material but the presence of sodium chloride in excess renders the fluid sterile after a few days, so that a potent and at the same

time a sterile toxin may be obtained by this method. Dr. Row concluded with an elaborate comparison between the properties of this salted toxin and those of Haffkine's plague prophylactic.

## APEPSIA.

SINCE the late Dr. S. Fenwick in 1870[1] described the condition of atrophy of the stomach, a large number of observations have clearly demonstrated that in certain cases the chemical processes which normally occur in the stomach may be entirely abolished. Pathological observation has confirmed the view of Dr. Fenwick that this condition is the result of a more or less complete atrophy of the glands of the mucous membrane of the stomach. In addition to the name of "apepsie" which has been applied to the condition by French authors, it has been called "anadenia ventriculi" by Ewald, "phthisis ventriculi" by Georges Meyer, and "achylia gastrica" by Einhorn. An interesting and exhaustive monograph has been published on the subject by Dr. H. Français.[2] In his historical account he states that the term "apepsia" was introduced by Galen and used by Molière in his "Malade Imaginaire"; Rokitansky in 1843 refers to a stomach showing a marked condition of atrophy, but undoubtedly the credit of first recognising and describing the condition belongs to Dr. Fenwick. Ponfick, in 1873, and Quincke in 1876 described examples of gastric atrophy in association with pernicious anæmia. Apart from records of cases little advance was made from the publication of Dr. Fenwick's second paper in 1877[3] until Ewald in 1886 proved that hydrochloric acid was absent from the stomach in these cases. From that time onwards a large amount of work has been devoted to the chemistry of the gastric contents, among the most important being that of M. Hayem and his collaborators who have shown the importance of the organically combined chlorides in regard to gastric digestion and have investigated their quantity in this condition. Dr. Français comes to the conclusion that apepsia is not a pathological entity but a syndrome occurring in association with various morbid states, and characterised by the abolition of the digestive functions of the stomach. In the most advanced type examination of the gastric contents shows an entire absence of free hydrochloric acid and of organic combinations of that acid; in others there may be an absence of free acid but a certain amount of organically combined chlorine. In both groups the digestive power of the juice is found to be wanting as tested by its action on proteins. Dr. Français describes the condition of chronic apeptic gastritis as that with which apepsia is most frequently associated. This disease is much more common in women and may be a sequel of any chronic inflammatory process affecting the gastric mucous membrane. Alcoholism, lead poisoning, and excessive tobacco smoking are all regarded as possible causes, the last condition accounting for a considerable proportion of the cases in men. The pathological anatomy comprises various forms of inflammatory and degenerative changes in the mucous membrane, especially parenchymatous or glandular gastritis, interstitial or mixed forms of gastritis, mucous transformation, and complete atrophy. In the last condition, which is that which most forms tend to reach, the mucous membrane may have a thickness not greater than half a millimetre and may consist of little more than a low cylindrical epithelium on a foundation of connective tissue with a few short glandular tubes. Clinically there may be recognised a latent form in which the symptoms may be very slightly marked, a form associated with great pain either shortly after food or from an hour to two hours later, and a form associated with severe diarrhœa. A similar condition of apepsia is not infrequently seen in association with cancer, either of the stomach or other organs, with pernicious anæmia, and with certain infections and intoxications—such as typhoid fever, uræmia, and diabetes. Dr. Français, in collaboration with M. Lion, was able to produce experimentally a condition of apepsia in dogs by means of the injection of a gastro-cytolysine prepared from the rabbit, an observation throwing considerable light upon the production of the condition through infective fevers and intoxications. It is also maintained by some observers that apepsia may occur in association with chronic nerve diseases, such as tabes dorsalis, and with neuroses and neurasthenia. The diagnosis of the condition of apepsia is usually easy and depends upon the results of the examination of a test meal, but the differentiation of the condition giving rise to the apepsia, whether gastritis, cancer, pernicious anæmia, or other chronic disease, is often a matter of great difficulty necessitating a careful consideration of the history, symptoms, physical signs, and of the blood count. For treatment Dr. Français recommends a careful regulation of the diet, avoiding fatty foods, and giving lightly boiled eggs and meat in small quantity. He finds that kephir is most valuable in these cases, especially in those with diarrhœa, commencing with a diet of kephir only and gradually introducing other food substances. In cases of gastric cancer with pyloric obstruction kephir is, however, contra-indicated. M. Soupault has obtained good results in the cases with diarrhœa from the administration of dilute hydrochloric acid given with lemon juice in the form of lemonade during the meal.

[1] THE LANCET, July 16th, 1870, p. 78.
[2] De l'Apepsie, par le Docteur Henri Français. Paris: G. Steinheil. 1906.
[3] THE LANCET, July 7th (p. 1), 14th (p. 39), and 21st (p. 77), 1877.

## THE HYGIENIC EFFICIENCY OF GAS FIRES.

AN elaborate series of practical observations on the use of gas fires for the warming of apartments will be found in a paper read by Mr. John H. Brearley of Longwood before the Institution of Gas Engineers and published in the *Engineer* of July 12th. Mr. Brearley considered that the best gas fire for warming a room was the one which gave the greatest proportion of radiation and the products from which were not allowed to enter the room. As sources of radiation he found that iron frets were superior to fire-clay "fuel" in the proportion of 136 to 125. Air-heating tubes or chambers at the back of a fire reduced the radiation. A thin body of "fuel" was essential to a high radiative efficiency. With regard to the loss of heat carried away with waste products (flue heat) Mr. Brearley said that it varied a great deal according to the method in which the fire was connected. The chimney should be allowed to draw a large portion of the air from the room without an excessive "vacuum" in the stove flue-pipe, as was the case when the whole of the air which left the room was drawn through the stove itself. For this reason those stoves which were provided with ventilating outlets, in addition to the flue-pipe, were to be commended. Where such devices were not used the whole of the chimney opening should never be blocked up. It was often assumed that the heating efficiency of a gas-fire stove was increased by doing this, whereas the reverse was the case. Tests that were made for carbon monoxide showed that this substance was either completely absent or else present in such small traces as to warrant the inference that gas fires did not produce carbon monoxide when properly constructed and kept clean. It was known that when a gas flame came into contact with a cold surface carbon monoxide was produced, but so far as gas fires were concerned this was almost entirely avoidable, and in cases of neglect it could only continue during the first few seconds after the fire was lighted. Flueless stoves should not be fixed in rooms which were habitually occupied as much carbonic gas escaped from them. These stoves were not so

economical of heat as was often supposed because they imparted heat to the air which immediately ascended to the ceiling, objects in the room remaining comparatively cold. This was a process of heating by convection, whereas the action of gas fires depended on the much better system of heating by radiation which warmed the objects in the room rather than the air.

## THE STUDY OF SPIROCHÆTÆ.

Schaudinn's observations upon the micro-organisms associated with the primary and secondary lesions of syphilis have acted as a powerful stimulus to the investigation of the genus spirochæta, alike by the student of pathology and by the protozoologist. But progress in this field of inquiry is still far from rapid, chiefly by reason of the small size and active movement of the majority of spirochætæ, for so great are the difficulties in the way of demonstrating details of structure, and so great are the difficulties of interpreting beyond possibility of question the appearances observed, that the data now at our disposal are still inadequate to dispose satisfactorily of even fundamental points. For example, the question of the position in nature occupied by spirochætæ is still a subject for discussion. Reproduction by longitudinal fission and the possession of a centrosome and of an undulating membrane are considered sufficient evidence by some observers of their title to rank in the animal kingdom, whilst others, relying on reproduction by transverse fission and the possession of diffuse nuclei and of flagella, would place them in the vegetable world, although a consensus of scientific opinion would at the present moment probably place the genus among protozoons rather than among bacteria. Again, the true relationship, if any, existing between spirochætæ on the one hand and trypanosomes on the other affords ample scope for speculative inquiry. In the meantime many of the facts that are accumulating so slowly are, as so often happens, derived from observations upon species which have no obvious and direct importance in medicine; nevertheless, the deductions drawn therefrom are of too great interest to be neglected. As a case in point we may mention some observations on spirochætæ derived from the oyster and from a British freshwater mussel, Anodonta cygnea (in which latter, by the way, they have not previously been noted as occurring), recently recorded by Fantham in the *Annals and Magazine of Natural History*. Dealing in the first place with the movements of these two species of spirochætæ—viz., spirochæta balbianii and spirochæta anodontæ, Fantham considers that the motion is resolvable into at least two components, the first a vibratory flexio of the body, mainly subserving the purpose of locomotion, and the second a spiral or corkscrew movement of the body as a whole, due to the winding of the membrane; this corkscrew motion is especially well seen in the case of spirochæta anodontæ, which has pointed ends. Compared with trypanosomes the spirochætæ seem to move more quickly and with an added corkscrew motion. Both the spirochætæ studied possess a spirally wound membrane, which is a lateral extension of the ectoplasmic periplast, a contradiction of the statements of Laveran and Mesnil who regard this structure as a loose investing membrane. The writer describes the undulating membrane as composed of longitudinally arranged "myoneme" fibrillæ, and it is these myonemes which set up the *transverse movements* in the surface of the body, manifested as waves passing down the body in a direction opposite to that in which the organism moves. The so-called "ciliate" (flagellate) stages in spirochætæ described by some writers Fantham regards as post-mortem products, for they are never seen during life, the apparent flagella or cilia being probably merely "myoneme" fibrils split off from the membrane during its rupture, which sometimes occurs during the violent contortions in the death struggles of the organism. Longitudinal fission is undoubtedly the more common form of reproduction, although observations are instanced which support the contention that transverse fission does actually take place; Fantham, however, apparently does not accept, at any rate in its entirety, Perrin's suggestion as to the presence of male and female forms. These observations are of very great interest and it remains to be seen how far the results obtained hold good for allied species and particularly for spirochæta pallida.

## MODERN ALCHEMY: TRANSMUTATION REALISED.

Sir William Ramsay has promised to communicate to the Chemical Society shortly a full account of his researches on the radium emanation. The occasion will mark a great epoch in the history of chemical science since his investigations have shown that a given element under the powerful action of the radium emanation undergoes "degradation" into another. In short, the transmutation of elements is actually *un fait accompli*. We already know that helion appears as the radium emanation disappears, while when the emanation is in contact with, and dissolved in, water neon is produced but when in contact with a solution of copper salts the chief product is argon. More marvellous still is the fact that when copper salts are used lithium appears where before was no lithium. Copper is thus "degraded" to the first member of its family—i.e., lithium. For aught we know to the contrary, the time may ultimately come—over, of course, ages and ages—when the metallurgy of the world will be "degraded" to the alkaline metals. It would appear, therefore, that the noble metals are slowly breaking down and that gold, platinum, uranium, and other elements of high atomic weight will disappear and that their descendants will be the commonplace elements. This would seem to teach that gold and the other metals exhibiting high atomic weights have, after all, a complex and unstable constitution, the tendency of which is to resolve into simpler substances. These remarkable discoveries remind us again of the extraordinary prescience of the ancients, of the presentiments of the alchemists who evidently had some sort of a conviction that, after all, there is a primary matter from which all other elements are formed by various condensations. He is a bold man who nowadays confesses scepticism about anything. The world has seen men who have said "it is impossible." Generations have succeeded them who have seen the "impossible" come to pass.

## THE RECOVERY OF RESIDUES FROM BRINE AND THEIR UTILISATION IN THE ROUTINE TREATMENT AT SPAS.

IN THE LANCET of July 28th, 1906, we referred in an annotation (p. 242) to an interesting communication which we received from Mr. F. Bale of Droitwich who drew attention to the fact that the ordinary scale which is produced in the brine evaporating pans contains certain mineral constituents which can be utilised with advantage in the routine treatment at spas. He stated that, amongst other things, the mother liquor contained the sulphates of calcium, magnesium, and sodium. If this liquor is diluted with water and salt scale added a mineral water is obtained effervescing, he says, with oxygen. We remarked that the disengagement of oxygen seemed to be singular and apparently proceeded from the dissolution of the hydrated sulphate of calcium, which is the chief constituent of the salt scale, although no chemical explanation of this production of oxygen gas was forthcoming. Mr. Bale now writes that there is no doubt that the gas evolved from the scale in water is oxygen or a gas rich in oxygen, as it gives all the reactions for

oxygen. The reaction, he remarks, by which the oxygen is evolved is no ordinary one, for the evolution is not constant or continuous. It is greatest in the sunlight and ceases often on a dark day, to commence again on a bright one, and the reaction goes on slowly in this way for months when it apparently ceases. If the water is renewed, however, the reaction starts again; in other words, a small amount of the scale would seem to be capable of oxygenating a large amount of water. When the receptacle contains a large amount of mineral water in contact with a layer of pan scale oxygen gas appears to be given off indefinitely. On examining the water and the scale under the microscope the presence of infusoria was revealed. Scale that had been ignited no longer gave oxygen in contact with water. The conclusion seems to be that the evolution of oxygen is due to the presence of infusoria in the scale, but it is difficult to understand how living infusoria can survive the evaporating process in the pan. The infusoria, if present, must have attached themselves to the scale after it had been removed from the evaporating pans. The evolution of oxygen in this way is, at all events, a very interesting phenomenon, whatever the correct explanation of its formation may be.

## CHLORIDE OF SODIUM AND HEART DISEASE.

ACCORDING to an editorial article in the *Indian Medical Record* for May 28th the conclusions of R. Massalonga and G. Zambeli are that the chloride of sodium is a regulator of the humours, of osmotic pressure, of arterial pressure, and of the dehydration of the tissues, but is at the same time a factor in asystolic phenomena and the dropsy of cardiac disease; they have therefore practised the limitation of chlorides in the dietary of all cardiac cases for several years, and they find that this limitation of chlorides soon restores the equilibrium and arrests all unfavourable symptoms. They, however, insist upon the supplemental use of diuretics or heart tonics which accelerate the cure of such cases. The chloride-free diet itself acts as a diuretic as it helps the removal of the œdema which remains as an obstacle to the heart's action, which once thus freed increases its own energy and tends to re-regulate its own function. Widal is another fervent supporter of this chloride-free dietary. It has been noted with reference to the elimination of the chlorides, continues the writer, that it varies in direct proportion to the amount of physical signs and symptoms present, for when the cardiac lesion is not productive of distress its elimination is normal, whereas when dyspnœa or evening œdema supervenes the elimination of chlorides is found to be deficient. The good results obtained in cardiac cases with an exclusively milk diet will now find an explanation in the comparative poorness of milk in salt (1·50 to 1·80 grains (*sic*) per litre). According to the writer in the *Record* the average individual consumes by far too much salt but as long as his kidneys do not refuse to carry off the excess all goes well. As soon, however, as inadequacy in these organs takes place from any cause and the chloride of sodium is retained an excess of water is absorbed to hold it in solution. Then the trouble begins, for the salt does not remain in the blood; it must pass into the tissues and in its passage it carries the water into them and in this way a condition of œdema has to be dealt with. A dechloridated diet means that a food is supplied devoid of one of the necessary elements required in tissue metabolism, and as this demand must be supplied the surplus in the tissues is called upon to do the needful, and so in its repassage back into the blood for its redistribution it carries with it the water which it had attracted, and so comes the reduction or disappearance of the œdema. We have thought it worth while to produce the foregoing abstract from the columns of our contemporary, merely making a few verbal alterations for the sake of clearness as the English of the article savours of the East. The subject is certainly one that calls for attention. Many people imagine that salt is a prophylactic against ill-health and that they cannot well consume too much of it. No doubt the value of common or table salt as an aliment is considerable, and the robust who make blood easily and rapidly can afford to take it in large quantities without injury. With delicate people, however, especially those whose thoracic organs are easily deranged, the habitual ingestion of more salt than is required by the system is sure to produce an ill-effect. The amount of salt that can be consumed daily with safety depends upon the constitution of the individual; it cannot be set down in precise terms like the dose of a quack nostrum.

## EPIDEMIC CEREBRO-SPINAL FEVER.

WE have already referred to the continued presence of the meningococcus in persons who had recovered from the clinical symptoms as observed by Dr. R. M. Buchanan of Glasgow and the same peculiarity has been noticed by others. At a recent meeting of a medical society in Heidelberg Dr. Krayer said that he had been able to cultivate the meningococcus from cerebro-spinal fluid in which it was not discoverable with the microscope; in one case the organism continued visible for 170 days. In Scotland during the week ended July 20th there were 7 deaths from this cause registered in Glasgow, 3 in Edinburgh, and 1 in Leith. In Glasgow the weekly report issued on July 19th showed that there were at that time 56 cases under treatment.

## RATS AND PLAGUE IN INDIA.

THE Trustees of the Indian Museum in Calcutta have published in pamphlet form at the price of 8 annas (about 7*d*.) a number of interesting particulars bearing on the identification of rats connected with plague in India. The pamphlet has been written by Dr. W. C. Hossack of the Plague Department, Calcutta, and in an introductory note Mr. N. Annandale, superintendent of the museum, states that a more detailed account by the same writer of the species occurring in Calcutta will be issued shortly by the Trustees in the first volume of the "Memoirs of the Indian Museum." Dr. Hossack says that the external differences between the various kinds of rats are so slight that, to one who is not an expert, specimens belonging to entirely different genera may present an apparently identical appearance. The most important body measurements are the lengths of the head and body, the tail, the hind feet, and the ears. These lengths are most accurately taken by sliding callipers, but a pair of compasses and a measuring rule or tape may also be used. The length of the head and body is taken from the tip of the nose, excluding hairs, to the centre of the vent. The length of the tail is taken from the centre of the vent to the tip of the tail, excluding hair. Minute directions are given for the preparation of skins and skulls, for the labelling of specimens, and for describing the colour of the animals according to Ridgway's scale of colours for the use of naturalists. Spirit is recommended as the most trustworthy medium in which to preserve specimens if skins cannot for any reason be prepared, but no time must be lost after the animal has been killed, or putrefaction may proceed even in the spirit. Carbolic acid may be added to the spirit in the strength of one ounce to the pint. Formalin may be used, but in India weak solutions are useless; the solution should never be under 15 per cent. strength of formalin—i.e., 6 per cent. strength of formic aldehyde, as formalin is a 40 per cent. solution of the latter. Dr. Hossack describes seven kinds of rat which are of importance in connexion with plague, two of them being mus rattus (the

English black rat) and mus decumanus (the English brown rat). Sketches of the heads and soles of the hind feet of several rats are shown for the purpose of better identification.

## THE PLAGUE IN INDIA:

### REPORTS ISSUED BY THE ADVISORY COMMITTEE APPOINTED BY THE SECRETARY OF STATE FOR INDIA, THE ROYAL SOCIETY, AND THE LISTER INSTITUTE OF PREVENTIVE MEDICINE.

THE Secretary of State for India early in 1905 placed the direction of an inquiry concerning some of the unsettled problems of plague with an Advisory Committee appointed by the India Office, the Royal Society, and the Lister Institute, acting in conjunction. The administration of an annual grant of money was also placed at the disposal of the Advisory Committee, which consisted of Surgeon-General A. M. Branfoot, C.I.E., as chairman and representing the Secretary of State for India; the late Sir Michael Foster, F.R.S., and Dr. J. Rose Bradford, F.R.S., representing the Royal Society; and Colonel David Bruce, C.B., F.R.S., and Dr. C. J. Martin, F.R.S., representing the Lister Institute.

The Advisory Committee proceeded to elect a working commission consisting of the following: Major George Lamb, I.M.S., Captain William Glen Liston, I.M.S., Dr. G. F. Petrie, Mr. Sydney Rowland, Captain T. H. Gloster, I.M.S., Dr. M. Kasava Pai, Mr. V. L. Manker, Mr. P. S. Ramachandrier, and Mr. C. R. Avari. At the end of March, 1905, Dr. Martin started for India to organise the labours of the Commission, leaving six months later, when Major Lamb became the director of the work. In 1906[1] the first report of the work of the Commission was issued and the historical introduction was published in our columns.[2] This was followed by sections dealing with the transference of plague by fleas, bugs, and other insects and, further, extremely interesting sections have now been issued dealing in the main with the connexion of rats with the spread of plague. We proceed to give a digest of these valuable reports:—

#### I.—EXPERIMENTS UPON THE TRANSMISSION OF PLAGUE BY FLEAS.

I. (ii.). *Section A.—Transference from rat to rat by proximity without contact in the presence of fleas.*—This group of experiments were in repetition of those of Gauthier and Raybaud (1902–03) and showed that in the common Indian rat flea (Pulex cheopis, Rothschild) plague may be spread from an infected rat to a healthy rat confined in close proximity, but in such a way as to prevent contact with the body or excreta of the infected rat. This condition was obtained by a suitable arrangement of twin wire cages standing in a glass box which was covered with fine muslin; each cage stood in a separate tray, so that there could be no mixing of excreta from the two animals. Into one cage (X) was placed a rat inoculated with a plague culture obtained from the spleen of an infected guinea-pig, along with some 20 fleas obtained from Bombay rats. As soon as this rat was found dead a healthy rat was placed in the other cage (Y). The dead rat was left in the X cage until from 8 to 12 hours later, when it was removed and examined for septicæmia. If no plague bacilli were found in the blood microscopically the experiment was abandoned. If the healthy rat died a careful post-mortem examination was made, the position of the buboes was noted, and smears from the buboes, spleen, and heart's blood were examined. Cultures were made from the liver and heart's blood and tested on rats. All rats which had not died within three weeks of being placed in the Y cages were killed with chloroform and examined to make certain that they were not suffering from a subacute or chronic form of plague.

In Series 1 wild Bombay rats were used in both cages. The experiments were made in October and November—i.e., before the commencement of the epizootic or epidemic plague in Bombay. In all the 11 tests the healthy rat did not contract plague. It is noted that many Bombay rats are immune to small doses of bacillus pestis, and further that the tins under the cages did not in this series contain sand and that the consequent wetting of them with urine caused the fleas to die out quickly. It is considered that these factors vitiated the results of this series. In Series 2 of 16 experiments the inoculated rat was a Bombay rat, while the healthy rat was in all cases a white rat imported from England and kept isolated. No case of plague had occurred in these rats. In 11 out of 16 experiments (69 per cent.) the healthy rat contracted plague. The full details of these experiments are given. No explanation of the negative experiments is suggested. In Series 3 Bombay rats were used in both cages and some of these rats may be considered to have been immune. They were caught in the houses and gullies of the city and isolated before use to prove their freedom from infection. In 50 complete experiments dealing with 35 house rats (Mus rattus) and 15 gully rats (Mus decumanus), 13 of the former (i.e., 37 per cent.) and six of the latter (i.e., 40 per cent.) developed plague. The report, assuming that 40 per cent. of Bombay rats are immune to the cutaneous injection of small doses of bacillus pestis, makes the percentage of positive results with susceptible animals to be 61 per cent., which approaches that of Series 2. "On 30 occasions, therefore, has a healthy rat experimentally contracted plague in sequence to living in the neighbourhood of a plague-infected rat under circumstances which prevented the healthy rat coming in contact with either the body or excreta of the plague-infected rat. In all cases a fairly abundant supply of fleas was present; these could pass freely between the two rats and, except for 'aerial contagia,' formed the only apparent means of communication between the animals. The presumption is that the plague was transferred from the sick to the healthy rat by the agency of the fleas." It was found impossible to perform control experiments in order to exclude aerial infection in the absence of fleas as this latter condition could not be certainly obtained.

*Section B.*—The next experiments dealt with the *transference of plague from rat to rat by the transference of fleas.* In these, Bombay rats were inoculated with a virulent culture of bacillus pestis, placed separately in flea-proof cages and supplied with rat fleas. In the event of any of these rats dying from plague and of their blood containing any bacillus on microscopical examination, the fleas were caught and transferred to a fresh flea-proof cage in which was placed a healthy rat. The flea-supply for each healthy rat was always obtained from two or more septicæmic rats. The same observations were made upon all the uninoculated rats that died as in the first series described above. All rats that had not died within three weeks were killed and examined. In Series 4 fleas collected from rats dead from the plague were transferred to healthy English white rats. In 8 out of 13 (61 per cent.) completed experiments the rats which received the fleas died from plague, while in five they remained healthy. The experiments are described in detail in the report. In Series 5 fleas were transferred from Bombay rats dead from septicæmic plague to healthy Bombay rats. Out of 25 completed experiments, 19 with Mus rattus and six with Mus decumanus, nine of the former species (i.e., 47 per cent.) and four of the latter (i.e., 66 per cent.) contracted plague. Allowing again 40 per cent. of Bombay rats to be immune to such a method of infection the percentage of positive results is raised to 87 per cent. In this section, accordingly, we read that "in 21 experiments out of 38 healthy rats living in flea-proof cages have contracted plague in sequence to receiving fleas collected from rats dead or dying of septicæmic plague in another cage. The possibility of the rat flea (P. cheopis) carrying plague from one rat to another is therefore demonstrated clearly."

I. (iii.). This deals with the experimental production of epidemics amongst guinea-pigs. In this research a highly ingenious series of small "go-downs" or cabins was designed by Lieutenant-Colonel W. B. Bannerman and Captain Liston and built under their supervision. They were of brick and mortar, with concrete floors on the top of a high plinth which were impervious to rats, and in each cabin was an inspection chamber separated by a screen of wire netting from an inner chamber for the animals under experiment, which chamber was separated from the roof by one or two layers of wire netting in the several huts. These also varied in the amount of light that was admitted to them, but the chief point of difference was in the construction of the roofs. In two these were made of ordinary country tiles, which were readily pervious to wild rats, two were made of Mangalore tiles, which were less pervious, and two of corrugated iron, which were entirely impervious to rats.

[1] Journal of Hygiene, vol. vi., No. 4, September, 1906.
[2] The historical introduction (Part I.) has already been published in our columns, *vide* THE LANCET, Nov. 3rd, 1906, p. 1233.

In the first four huts it was intended, and it happened, that wild rats should enter through, and build nests in, the roof, but they had no direct contact with the experimental animals, being separated from them by the wire ceiling built in under the roof of the hut. These differences had only one effect. The supply of fleas reaching the animals in the huts varied in accordance with the number of wild rats above them and the amount of light admitted to the huts, darkness being the more favourable condition for fleas. It was attempted to keep the two huts with impervious roofs absolutely free from fleas, but this was not found possible. The experiments were elaborate and ingeniously devised, and their course was constantly controlled by "flea-censuses" repeatedly held on animals taken from the various huts; these were accomplished by chloroforming the animals, and incidentally the fleas they harboured, combing out the latter and counting them. Unexceptionable bacteriological evidence was obtained of the cause of death of every animal that died. The animals employed in the observations were chiefly guinea-pigs and the experiments were divided into six series. The method adopted was to place together in the same hut healthy and inoculated guinea-pigs, the variable quantity in the experiments being the flea-supply from the roof, as we have already indicated. The experiments in some cases lasted nearly two months and the results of the various series are thus summarised in the report after a description of the experiments in detail.

*Series A* (six experiments) showed that epidemic plague did not occur when healthy guinea-pigs lived in close contact with plague-infected guinea-pigs under conditions where access of fleas was prevented, but that under otherwise similar conditions plague spread among the healthy animals in places where fleas were abundantly present. It is noteworthy that the huts were not cleaned out during the whole time (one or two months) occupied by these experiments and the animals took their food from the floor which was contaminated by the excreta of their sick companions. In these circumstances, although an occasional guinea-pig succumbed to plague, the disease did not spread epidemically in the absence of a flea-supply.

*Series B* consisted in one experiment in which the transference of fleas from guinea-pigs dying from plague started an epidemic in an uninfected hut which, by the introduction of fresh fleas, was maintained.

*Series C* (three experiments) showed that when an epidemic has occurred among a number of guinea-pigs the contagion still remains in the place and is effective in proportion as the animals are accessible to, and found to be infested with, fleas.

*Series D* was a single experiment and showed that fleas removed from infected guinea-pigs and isolated in test-tubes can convey plague to healthy animals on which they are allowed to feed.

*Series E and F* were also single experiments. *E* showed that plague is not conveyed from mother to offspring in the absence of fleas. In *F* two monkeys were used and one was exposed without harm in a plague-infected cage in which it was protected from fleas by a layer of "tangle-foot" (i.e., a sort of sticky fly-paper) which surrounded it. Another monkey, not protected from fleas, succumbed to plague.

Other general conclusions of these experiments are thus summarised: 1. If fleas are present then the epizootic once started spreads from animal to animal, the rate of progress being in proportion to the number of fleas present. 2. An epizootic of plague may start without direct contact of healthy animal and infected animal. 3. The conclusions of Part II. that the rat flea can convey plague from rat to rat are confirmed. 4. Infection can occur without any contact with contaminated soil, as in certain of the experiments the animals were raised in cages from the ground. 5. Aerial infection is excluded, as guinea-pigs suspended in a cage two feet above the floor did not contract the disease, whilst in the same hut the animals running about became infected.

In these experiments the buboes developed in the infected animals in the following situations.

Bubo in one situation, 162 (90·5 per cent.): neck, 144 (88·9 per cent.); groin, 15 (9·3 per cent.); and axilla, 3 (1·8 per cent.).

Buboes in two situations, 13 (7·2 per cent.): neck and groin, 10 (77 per cent.); and neck and axilla, 3 (23 per cent.).

Buboes in three situations, 2 (1·1 per cent.)—i.e., axilla, neck, and groin, 2 (100 per cent.).

No bubo, 2 (1·1 per cent.).

I. (iv.). *Experiments in Plague Houses in Bombay.*—The next series of experiments was carried out in houses infected with plague in Bombay. They were made in rooms in which two or more people were suffering from the disease or in which rats suffering from plague or dead had been discovered. The report points out that these conditions did not render it absolutely certain that the rooms were infected, as the patients might have contracted the infection elsewhere and some of the rats might have died from poison and not plague. The method adopted was the letting loose of guinea-pigs under varying conditions in the rooms, followed by an unexceptionably complete bacteriological investigation into the cause of death of all those that succumbed. The experiments are described in three groups of two series each.

In *Group 1* guinea-pigs were allowed to run free from about 18 to 40 hours in the selected houses, a technique that was devised by Captain Liston. Following the results obtained in the other series of experiments special attention was paid to the number of fleas found on the animals, which were, moreover, carefully differentiated as human, cat, or rat fleas. In this group Series 1 dealt with guinea-pigs running free in plague houses that had not been disinfected; these animals were found to act as good traps for fleas, on an average 20 per room being obtained, most of them rat fleas. 42 experiments were done and in 12—i.e., 29 per cent.—those left in from 18 to 40 hours contracted plague, the bubo being situated generally in the cervical region. Of the 18 experiments in which more than 20 fleas were obtained 50 per cent. gave similar positive results. In Series 2, 31 observations were made in a similar manner in houses that had been previously disinfected, chiefly by washing the floors and walls with an acid solution of perchloride of mercury of strength 1 in 750; in a few burning sulphur was employed. The points observed were again the number of fleas caught on the guinea-pigs and the number that contracted plague. The former numbers were very large, the average being 40 per house. In nine houses the animals died from plague—i.e., in 29 per cent. of the experiments, this being the same number as was obtained in the non-disinfected houses. Of 13 cases in which more than 20 fleas were caught 38 per cent. gave positive results. The buboes were chiefly cervical. It has been abundantly proved that the disinfection processes kill all plague bacilli on the floors and walls, but they do not affect the flea inhabitants of the house; these observations afford strong support to the contention that fleas are the agents in spreading the disease.

In *Group 2* fleas obtained in plague houses were fed upon rats or guinea-pigs in flea-proof cages in the laboratory. In Series 3 the fleas were caught on plague-infected rats caught in the houses; three experiments were done, and in each case plague was transmitted to the animals in the laboratory. In Series 4 the fleas were caught on guinea-pigs and other animals which had been left for some hours in the plague houses; in 8 out of 40 experiments the laboratory animals which were supplied with these fleas contracted the disease.

In *Group 3* the experiments were contrived so that whilst all the experimental animals were protected from both floor and wild-rat infection half were protected from fleas whilst the other half were not. For each experiment a pair of animals was thus used. In Series 5, 42 experiments were made in which pairs of caged guinea-pigs, one protected from fleas by means of a fine wire gauze curtain, and the other not so protected, were placed side by side in a plague house. Both were equally subject to aerial infection. No protected animal caught plague, whilst four of the unprotected animals died from it, developing cervical buboes; many fleas were caught on them and none on the protected animals. Series 6 was performed with pairs of animals in suitable cages, one of which was surrounded with "tangle-foot" in order to prevent fleas from gaining access to it, and the other with sand which gave no such protection. It was found that no animal protected by a sufficiently broad layer of "tangle-foot" contracted plague, but 24 per cent. of the control animals did so. Out of 247 fleas caught on the "tangle-foot" 60 per cent. were human, 34 per cent. were rat, and 6 per cent. were cat fleas. Bacilli resembling bacillus pestis were demonstrated in the stomach contents of one out of 85 human fleas dissected, and of 23 out of 77 rat fleas. Tables are given in the report with full details of all the experiments done in this part of the investigation.

II.—The second paper in the report is a Note on the Species of Fleas found upon Rats, Mus rattus and Mus decumanus, in different parts of the world, and upon some variations in the

proportion of each species in different localities, by the Hon. N. Charles Rothschild, M.A., F.L.S.

III.—This paper is a careful and excellently illustrated description of the Physiological Anatomy of the Mouth Parts and Alimentary Canal of the Indian Rat Flea (Pulex cheopis, Rothschild).

IV.—This paper describes an experiment made to discover the Effect upon Virulence of the Passage of Bacillus Pestis through Rats, by subcutaneous inoculation of infected spleen pulp from one to another, without intermediate culture; this was done to test a statement that such a passage of infection was a matter of great difficulty, and that the organism loses virulence in the bodies of rats, an intermediate host being necessary for the maintenance of an epizootic. This statement is opposed by the result of the experiment, which gave no evidence that the passage of plague from rat to rat is accompanied by any decrease of virulence. 26 such passages were effected without recourse to artificial media. Evidence was, however, obtained of the varying susceptibility of the Bombay rat.

V.—This deals with a variation of the preceding experiment, the infected spleen pulp being inoculated cutaneously, after scarification of the abdominal skin (in a manner similar to ordinary "vaccination"). It was found that a large percentage of Bombay rats are immune to this method of inoculation. Out of 580 rats 239 died from plague, whilst 341 were alive and well after 14 days—that is, 50 per cent. were immune to this method. No alteration in virulence was noted.

VI.—A Note on the Immunity of Bombay Rats to the Subcutaneous Injection of Plague Cultures, dealing with two series of experiments made during 1904 and 1906 respectively. They prove that at the latter period the Bombay rat was no more susceptible to plague than at the former.

VII.—This paper is on the Infectivity of Floors grossly Contaminated with Cultures of Bacillus Pestis. The floors used in the experiments were of two sorts: (*a*) of ordinary cow-dung plastered, when moist, on the top of earth which had previously been beaten down; and (*b*) of "chunam," which is a mixture of sand and lime, put down moist and allowed to set. The report thus summarises the results: (1) Floors of cow-dung grossly contaminated with bacillus pestis remain infective for 48 hours, the infectivity being tested by rubbing scrapings into susceptible animals; (2) floors of "chunam" similarly contaminated do not remain infective even for 24 hours; (3) floors of cow-dung similarly contaminated remained infective for 12 hours but not for 24 hours to susceptible animals which were allowed to run about freely on them; and (4) under similar conditions floors of "chunam" remained infective for six but not for 12 hours.

VIII.—This section is on the Number of Plague Bacilli in the Blood, Urine, and Fæces respectively of Rats which had Died from Plague. It is thus summarised. "The blood of plague-infected rats may contain an enormous number of plague bacilli, even as many as 100,000,000 per cubic centimetre having been found before death. On the other hand, rats occasionally die from plague with little or no septicæmia. An insect sucking the blood of most rats shortly before death would imbibe a large number of bacilli. While the blood of a rat may have so many bacilli the urine may have none at all, or at least less than 10 per cubic centimetre. Plague bacilli were discovered in the urine in 29 per cent. of the cases. When the urine does contain plague bacilli they are always present in much fewer numbers than in the blood. The fæces of rats dead of plague, the blood of which contained abundant bacteria, are not highly infective and would appear to play little part in spreading the epizootic."

IX.—This paper deals with the Quantitative Estimation of the Septicæmia in Human Plague. The results of the investigation on which it was founded are as follows. 74 examinations of specimens of the blood from 28 patients were made. Bacillus pestis was found in 16 fatal cases. It was not found in seven fatal cases nor in five cases that ended in recovery. It is further noted that microscopic examination of the blood cannot be regarded as a trustworthy criterion of the degree of septicæmia. This may be present, however, at a comparatively early stage of the disease and for a considerable number of hours before death, and the septicæmia may be of an irregular or fluctuating type.

X.—The last investigation with which this report deals is on the important epidemiological point of the Existence of Chronic Plague in Rats in Localities where Plague is Endemic. During one month 1800 rats were caught alive in two villages where plague has recurred annually for three years without discoverable reinfection, but at the time the rats were caught, with one exception, there was no active plague in the villages. In seven of the rats, although they all seemed healthy when alive, chronic abscesses were found in the abdomen from which bacillus pestis was in each case cultivated. The situation of the lesions seems to point to an intestinal infection. The organs were apparently normal and there was no emaciation. Of the animals inoculated directly from, and with subcultures of, the abscesses only one survived.

The next series of reports are in continuation of those just summarised and previously published in the *Journal of Hygiene*. They are published in the same journal[3] and they contain the results of observations and experiments made in the laboratory. The following papers are now issued:—

XI. *On the diagnosis of natural rat plague.*—During 16 months' work the Commission examined about 150,000 rats, of which 19,000 proved to be plague-infected. The post-mortem records of 4000 of these plague rats have been carefully analysed. The writers consider that the most important naked-eye signs by which plague may be identified are: the presence of a bubo (present in 85 per cent.); the presence of general subcutaneous congestion, with hæmorrhages both under the skin and in the organs; a "granular" liver in which the surface of the organ is dotted over with minute white or grey specks; and an abundant clear pleural effusion. The size and appearance of the spleen were found to be variable and of subsidiary diagnostic import. In the earlier part of the work great importance was attached to microscopical examination of smears of the blood and organs. Subsequent experience, however, coupled with experiments with inoculated and normal rats carefully devised to test the skill of the examiners, convinced the writers that naked-eye examination by an experienced observer is more satisfactory for purposes of diagnosis than microscopical examination alone. Naturally in isolated cases both methods must be employed, but the results clearly show that the omission of the routine microscopical examination of every rat in an investigation conducted on a large scale does not necessarily impair the accuracy of the work, while the saving of labour is, of course, very great. The bubo is shown to be the most important structure to examine microscopically. Thus out of 1000 plague-infected rats with buboes plague bacilli were by microscopical examination found in the bubo of 991, in the spleen of 901, and in the heart-blood in only 375. The inoculation of suspected material upon the shaven abdomen of the guinea-pig has proved of the greatest value for diagnosis; the method appears to fail only in about 2 per cent. of fresh, and about 10 per cent. of putrid, rats. In this connexion the writers point out that the bacilli found in naturally infected rats are fully virulent, 62 per cent. of the inoculated animals dying from acute plague in five days or less. No disease of the rat was met which caused any material difficulty in diagnosis.

XII. *The pathological histology of the spleen and liver in spontaneous rat plague* has been examined by Dr. J. C. G. Ledingham of the Lister Institute in material collected by the Commission in Bombay. In the spleen the incursion of bacillary swarms produces in the early stages extensive hæmorrhages, congestion of the pulp sinuses, and perinodal areas of necrosis. In later cases definite abscess formation occurs and is accompanied by extensive reaction on the part of the plasma cells which form a barricade separating the lymphoid tissue of the node from the necrotic zone. The bacilli are very rarely found in the interior of the nodes, yet karyorrhexis of the nodal cells is frequently far advanced through a toxic action. In the liver focal necroses may be so numerous that little healthy liver tissue remains. Bacilli are nearly always found in the central capillaries of these foci and actual bacillary embolism was frequently noticed. In some cases no free bacilli were demonstrable, all the organisms having been taken up by endothelial cells which appear to be largely responsible for the removal of the bacilli. The writer also notes the occurrence of giant cells of Langhans' type in the neighbourhood of necrotic foci.

XIII. *Transmission of plague by feeding rats with infected material.*—During the last ten years in which plague has been experimentally investigated much work has been done

[3] Journal of Hygiene vol. vii., No. 3, 1907, pp. 324-476.

with the view of settling the questions: (1) as to whether it was possible to produce the disease in animals by feeding, and (2) as to whether this method of transmission played an important part in the epizootic or epidemic spread of the disease. The Indian Plague Commission (1901) pointed out that while three workers in India—namely, Gibson, Hankin, and Simond—had failed to infect rats by means of feeding, both the German and Austrian Plague Commissions had been able to give the disease to animals by this method. Kolle (1901), Kister and Schumacher (1905), Berestneff (1906), and Klein (1906) also successfully conveyed plague to rats by feeding them with infective material.

The experiments carried out by the present Commission may be briefly summarised as follows: 415 wild Bombay rats (Mus rattus and Mus decumanus) were given one meal consisting of about one-eighth of the viscera of a rat or guinea-pig dead from acute plague; 16 per cent. died within five days from acute plague, and in all 21 per cent. were infected. In comparison with these animals a series of rats (Mus rattus) caught on ships in Bombay, and which presumably had not experienced any epidemic of plague, were fed in the same way and 44 per cent. were infected. A further series of wild Bombay rats were fed on the whole carcasses of dead plague rats—i.e., including bone and other hard material—and 38 per cent. were infected. Similar experiments were also made in the Punjab with Mus rattus: of 28 animals which each received one half of the liver and spleen of a plague rat, 19 (68 per cent.) died all from acute plague in five days.

The writers direct especial attention to the post-mortem appearances of the rats thus infected by feeding. These differed markedly from those seen in naturally infected rats in that subcutaneous hæmorrhages were uncommon, the intestines were congested with hæmorrhages and ulceration of Peyer's patches, and three-quarters of the animals with buboes had mesenteric buboes which do not occur in naturally infected rats. These observations afford very strong evidence that rats in nature are not infected by feeding as has been often surmised. The paper concludes with a record of experiments, in which 194 rats were fed with urine from 35 cases of acute human plague; none of the animals became infected.

XIV. *On the significance of the localisation of the primary bubo in animals infected with plague in nature.*—Almost all observers are agreed in the opinion that the primary bubo develops in the glands in connexion with those lymphatics by way of which the plague bacillus has entered the body. Hunter (1904–06), on the other hand, holds that the primary bubo is merely an enlargement of a group of glands in the course of an acute septicæmic disease and is no indication of the path by which infection has taken place. In the present report experiments are detailed showing that the primary bubo develops in those groups of glands which are in direct lymphatic connexion with the skin area through which the plague bacillus gains an entrance into the body. Analysis of the records of a large number of animals infected naturally and in the laboratory gave the following results as to the localisation of buboes. Of rats found infected with plague in nature in the plague season in Bombay, in the off-plague season in Bombay, and in the Punjab villages, 72, 73, and 57 per cent. had cervical buboes and none had mesenteric buboes; three series of rats infected in the laboratory by the transmission of infected fleas showed cervical buboes in 67, 50, and 61 per cent. and no mesenteric buboes; while of rats infected by feeding only 36 per cent. showed cervical buboes and 72 per cent. had mesenteric buboes. The following table summarises these observations as shortly as possible:—

*Table showing the Percentage Frequency of Buboes in Different Parts.*

| — | Naturally infected. | Infected by fleas. | Infected by feeding. |
|---|---|---|---|
| Rats examined ... | 5188 | 117 | 119 |
| Rats without buboes | 16 per cent. | 18 per cent. | 8 per cent. |
| Cervical bubo ... ... | 72 ,, | 61 ,, | 36 ,, |
| Axillary ,, ... ... | 23 ,, | 22 ,, | 1 ,, |
| Inguinal ,, ... ... | 18 ,, | 35 ,, | 1 ,, |
| Mesenteric ,, ... ... | 0 ,, | 0 ,, | 72·5 ,, |

The writers conclude, therefore, that *naturally infected rats are not infected by feeding* and that these results afford additional evidence that they are infected by the agency of fleas. A similar series of analyses shows that the distribution of buboes in guinea-pigs artificially infected by fleas is identical with the distribution in those animals which become infected in sequence to being placed for a few hours in plague-infected houses in Bombay.

XV. *Further observations on the transmission of plague by fleas, with especial reference to the fate of the plague bacillus in the body of the rat flea (Pulex cheopis).*—It was previously shown by the writers[4] that plague may be transferred from rat to rat by the transference of fleas from a septicæmic to a healthy animal. In the present communication the following questions are dealt with:—

1. The fate of the plague bacillus in the body of the rat flea.
2. Whether a single rat flea can transmit the infection.
3. Whether both male and female rat fleas can transmit the infection.
4. Whether other species of fleas can transmit the infection.
5. The mechanism by which the flea infects a healthy animal.

The results of the investigation of these points may be summarised thus:—

1. The average capacity of a rat flea's stomach is approximately 0·5 cubic millimetre. On this basis a flea imbibing the blood of a plague rat showing a good septicæmia might take as many as 5000 germs into its stomach.
2. Multiplication of the plague bacillus takes place in the stomach of the rat flea.
3. The approximate proportion of fleas in the stomach of which multiplication of plague bacilli takes place has been determined and it has been shown that this proportion varies with the season of the year, being six times greater in the epidemic season than in the non-epidemic season.
4. Plague bacilli are present in the rectum and fæces of fleas taken from plague rats and such fæces are infective to guinea-pigs both by cutaneous and by subcutaneous inoculation.
5. On rare occasions plague bacilli have been found in the œsophagus, but never in any other region of the body, such as the body cavity or salivary glands.
6. During the plague season fleas might remain infective for 15 days after imbibing infective blood, but during the non-epidemic season no animal was infective after the seventh day.
7. A single rat flea may transmit the disease.
8. Both male and female rat fleas can transmit the infection.
9. Experimenting with cat fleas (Pulex felis) and human fleas (Pulex irritans) 27 experiments with the former were unsuccessful, and out of 37 experiments with the latter three successes were obtained. Two experiments were made with Ceratophyllus fasciatus; both were successful. Multiplication of the plague bacillus takes place in the stomach of the human flea.
10. The plague bacillus has never been seen in the body cavity or in the salivary glands of infected fleas.

Evidence has been obtained to show that the bite of a healthy flea affords a sufficient avenue for infection by septicæmic blood if it is spread upon the bitten part. No evidence has been obtained in favour of infection by contaminated mouth parts or regurgitation from the stomach, but the possibility of infection by such means cannot be excluded.

XVI. *Experimental production of plague epidemics among animals.*—We have summarised above several series of experiments which had as their object the determination of the relative importance of the Indian rat flea, Pulex cheopis, and of actual close contact in the absence of fleas in the dissemination of plague from animal to animal. These observations were carried out in a series of small go-downs or cabins which were built especially for the purpose. The experiments recorded in the second report are a continuation of those already published. They were carried out during the off-plague season of 1906 and the plague season of 1907. In the first paper the structure of the go-downs was described in detail, but it may be repeated that the essential difference between them lies in the structure of the roofs. The roofs of four of the go-downs are tiled with material which offers protection and shelter to the wild rat of Bombay; the flea supply in the interior is therefore more or less abundant. The roofs of the two remaining go-downs are constructed of

[4] Ibid., vol. vi., p. 446.

"reinforced concrete"; in consequence of this these go-downs remained absolutely free from fleas, so that a number of clean contact experiments were obtained.

Five guinea-pigs inoculated with plague were confined in one of the go-downs with 25 healthy animals. It is shown that the healthy animals never contract plague in the absence of fleas, though living, in some instances for several weeks, in close contact with plague-infected animals. In the huts which were not flea-proof the epidemics of plague were shown to progress differently at different seasons of the year. In the height of the prevalence of epidemic plague the progress was very rapid, while in the off-plague season the infection travelled more slowly through the healthy guinea-pigs and in some cases killed only a portion of them. It is shown that the progress of the epidemic among the guinea-pigs is proportional to the abundance of fleas and that the explanation of its seasonal variation is probably to be found in the effect of seasonal influences on the prevalence of these insects. Another series of experiments shows that in go-downs containing plenty of fleas animals do not contract plague if they are protected by being suspended in mid-air or by a cage of wire gauze impervious to fleas.

XVII. *Experiments in plague houses in Bombay.*—In a paper published in the first report and summarised above there were detailed a number of observations which were carried out in plague houses. During the epidemic of 1907 these observations have been confirmed and amplified. Guinea-pigs were allowed to run about in plague-infected houses overnight; in 18 out of 100 experiments the animals subsequently died from plague. Fleas caught on guinea-pigs or rats in plague-infected houses were transferred to healthy guinea-pigs in flea-proof cages in the laboratory; in 34 experiments these animals died from plague in 14 instances (41 per cent.). By using guinea-pigs as flea-traps an estimate was made of the abundance of fleas in different houses. Houses proved to be plague-infected were found to yield 12 times as many fleas as houses which were not plague-infected and three times as many as those which were only suspected of being plague-infected. Of 130 fleas dissected 32 per cent. were found to contain abundant plague-like bacilli in their stomachs.

XVIII. *On the external anatomy of the Indian rat flea (Pulex cheopis) and its differentiation from some other common fleas.*—This paper gives a detailed account of the external anatomy of the rat flea, with two illustrative plates. A third plate shows the cat, human, and other fleas, and the points by which Pulex cheopis may be distinguished are dealt with. The writers consider that Pulex cheopis is identical with Pulex pallidus, Pulex murinus, Pulex philippinensis, and several other species which have been described.

XIX. *On the natural occurrence of chronic plague in rats.*—In continuation of a previous note the writers describe 45 cases of localised encapsuled abscesses containing virulent plague bacilli which they have met with in Mus rattus in the Punjab villages. In 27 instances these abscesses were in the situation of peripheral lymphatic glands and may probably be taken to represent the remains of buboes; these cases occurred chiefly during the period of the decline of the epizootic of acute plague. In the remainder, however, they were situated in the spleen (12), the mesentery (5), or the liver; and these animals were found in the interval between the epizootics. The rats were in all cases trapped alive and appeared to be healthy. In Bombay only one such case has been met with in 19,000 plague-infected rats, while in the Punjab these examples of chronic plague account for more than 10 per cent. of all rats found infected. While pointing out that these localised abscesses are the only place where plague bacilli are known to occur during the off-plague season in the Punjab, the writers can find no direct evidence that such a condition ever lights up into an acute septicæmia and, chiefly on anatomical grounds, express their doubts as to whether it can be a source of origin for the acute epizootic.

XX. *A note on man as a host of the Indian rat flea.*—The experiments described above, and since repeated with similar results, afford ample confirmation of the observation of Simond (1898) and of Gauthier and Raybaud (1902, 1903) that plague may be transmitted from rat to rat by the agency of rat fleas. The direct experiment to show that plague can be conveyed in the same way from rat to man can never be made, and the inferential transference of the results of the experiments on rats to the spread of human plague has been not a little opposed, notably by Galli-Valerio (1900, 1903), on the ground that rat fleas do not bite men. This may be true of the fleas (Ceratophyllus fasciatus and Ctenopsylla musculi) commonly found on rats in Western Europe, but Gauthier and Raybaud (1902, 1903) in Marseilles and Tidswell (1903) in Sydney obtained direct evidence to the contrary with regard to Pulex pallidus (= Pulex cheopis), and Liston (1905) found that Pulex cheopis in Bombay readily attacks man during the plague season. The present Commission has made many observations which show that Pulex cheopis will make use of man as a host and may be captured in large numbers on men in plague-infected houses.

One of the methods employed was the following. About 40 fleas, caught on wild Bombay rats, were placed in a wide-mouthed jar which had a little sand at the bottom. Twice daily a man's hand and forearm were introduced into the jar and left in for 15 minutes each time. Fleas which crawled up the forearm were gently pushed back before they could escape. It was observed that the fleas bit readily and the man himself was soon cognisant of the fact. About every ten days the sand was removed and fresh sand substituted, so that multiplication of the original fleas by breeding was excluded. Five experiments in all were done after this method with the following result.

*Experiment 1.*—One flea was found alive on the twenty-fourth day.

*Experiment 2.*—One flea was found alive on the ninth day. In this experiment the sand had not been washed and there was present a fine dust, which by blocking the tracheal openings was probably prejudicial to the lives of the fleas. They were often observed to be dusted over with this material.

*Experiment 3.*—One flea was found alive on the twenty-fifth day.

*Experiment 4.*—One flea was found alive on the twenty-fifth day.

*Experiment 5.*—One flea was found alive on the twenty-seventh day.

From the above experiments it is seen that it was possible to keep rat fleas alive for nearly four weeks by feeding them on human blood. There was a considerable mortality during this time, but the main facts stand out (*a*) that they fed readily on man and (*b*) that some of them were still alive after 25 days.

It may be mentioned that rat fleas kept in similar circumstances, but without food, never survived longer than one week.

The following observations, which were carried out in a building which was unusually severely stricken with plague, are also of interest in this connexion:—

1. April 17th.—40 fleas were caught on a man who went into one of the rooms for a short time. They were all Pulex irritans.

2. April 18th.—113 fleas were caught on a man who entered one of the rooms. The species were as follows: Pulex irritans, 55; Pulex cheopis, 51; and Pulex felis, 7.

3. April 19th.—76 fleas were caught on a man who entered one of the rooms for a short time. The species were as follows: Pulex irritans, 40; Pulex cheopis, 34; and Pulex felis, 2.

4. April 20th.—80 fleas were caught on a man who entered one of the rooms. The species were as follows: Pulex irritans, 18; Pulex cheopis, 60; and Pulex felis, 2.

Thus, in three out of four rooms of this chawl, which was badly infected, abundant rat fleas were taken on the legs of men who entered the rooms only for a short time.

The results of the analysis of the extensive epidemiological observations of the Commission in the villages of Bombay and the Punjab have still to appear.

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PUBLIC HEALTH AND BACTERIOLOGICAL RESEARCH LABORATORY FOR WOMEN MEDICAL PRACTITIONERS.—The governing board of the Middlesex Hospital has added to the medical school a laboratory which will be devoted entirely to the use of women medical practitioners for obtaining instruction for the examinations for the diploma in public health and of women students generally for the purposes of research work in bacteriology and general pathology. The new laboratory, which is on premises in Mortimer-street adjoining the Middlesex Hospital, is fully equipped for 12 workers and will be under the charge of Mr. A. G. R. Foulerton, director of the bacteriological and public health department of the Middlesex Hospital Medical School, with Miss Hilda K. Whittingham, M.B. Lond., as demonstrator.

# DECENNIAL SUPPLEMENT FOR 1891-1900 TO THE SIXTY-FIFTH ANNUAL REPORT OF THE REGISTRAR-GENERAL.

## PART III.[1]

IN dealing with that portion of his report which treats of the causes chiefly responsible for English mortality in the decennium last ended Dr. Tatham has prepared an interesting table showing the balance of loss and gain in the fatality of certain diseases. From this we learn that, as compared with the preceding decennium, an average annual life saving of 540 persons has been achieved in each million of the population during the period referred to.

Among the causes of death specified in the table an increased mortality was shown in nine—viz., measles, influenza, diphtheria, diarrhœa, pneumonia, tuberculosis (other than tuberculous phthisis, peritonitis, and meningitis), cancer, diabetes mellitus, and Bright's disease. The remaining diseases, 15 in number, showed in each case a reduced mortality. The mortality from small-pox in 1891–1900 was lower than that of the 10 years immediately preceding by 80 per cent. But a mere statement of the recorded death-rate gives an imperfect idea of the extent to which a community has suffered from small-pox. Unfortunately, the returns under the Infectious Diseases Notification Acts of 1889 and 1899 are not yet sufficiently complete to measure the incidence of sickness from this disease throughout the country generally. They are, however, complete for the administrative county of London, where the Act for the compulsory notification of infectious diseases has been strictly enforced since 1890. The actual number of cases notified from time to time appears in Sir Shirley F. Murphy's returns which are published weekly by the Registrar-General. Our readers will remember that in the years 1893–95 London experienced a serious outburst of small-pox. In the then existing vaccinal condition of the community terrible suffering and loss of life would have followed had it not been for the prompt removal of first cases; but this removal, thanks to the coöperation of the Metropolitan Asylums Board, was secured in practically every case. Nevertheless, the recorded mortality, which in no single year exceeded 5 in 100,000, conveyed no adequate warning of the danger. In the metropolis the information concerning the vaccinal condition of the small-pox cases contrasts favourably with that in other parts of England; for whilst in London the proportion of cases reported without statement as to vaccinal protection amounted to not more than 30 per cent., it exceeded 70 per cent. in the provinces. In the ten years ended 1900 there were registered in London 432 deaths, against 3626, or about eight times that number, in extra-metropolitan England. In London the proportion of cases stated to have been vaccinated was 30 per cent.; in the provinces it was only 12 per cent. In the former area the unvaccinated cases are stated to have constituted 40 per cent. of the whole; in the latter area, 18 per cent. only.

In the present report an interesting account is given of the behaviour of fatal influenza in this country from the time of its first appearance in epidemic form some 18 years ago down to the present time. Until the year 1890 England had been practically free from influenza mortality for more than 30 years. The mortality directly attributed to this cause in the quinquennium ended 1889 averaged no more than 3 per 1,000,000 of the population. Towards the close of 1889, however, influenza invaded our ports from the continent and thenceforward it appears to have established a foothold in this country. In 1890, the first complete year of the epidemic, influenza was returned as the cause of death in 4523 instances; in the following year the deaths rose to 16,686, and in the next the number was 15,737. The mortality due to this cause averaged 361 per 1,000,000 in the ten-year period ended 1900. In no single year of the ten did the rate fall below 122 per 1,000,000, which was the proportion recorded in 1896. At all ages of both sexes the mortality from influenza in the recently ended decennium does not greatly differ from that of the epidemic years 1847 and 1848, but at ages from 15 to 65 years the disease seems to have been more fatal in the later than in the earlier period, whilst at ages below 15 and above 65 years the reverse appears to have been the case.

Among the diseases that showed increased prevalence in the decennial period under notice the most important from a public health point of view is diphtheria, the mortality from which affection showed an increase on the rate of the preceding decennium of not less than 72 cent. The actual incidence of this disease is now more accurately expressed by the mortality returned under the head of diphtheria than was formerly the case. Nevertheless, the mortality is still probably understated in the tables, for it is known that a considerable portion of the deaths ascribed to such conditions as "tonsillitis," "quinsy," "ulcerated throat," "catarrhal laryngitis," &c., are really diphtheritic in character. With the more general adoption of bacteriological methods of diagnosis it is probable that a still larger proportion of these deaths will be returned as diphtheritic. At any rate, it is satisfactory to learn that the mortality under every one of the indefinite headings just mentioned has steadily fallen in recent years. It is important to remember that the Royal College of Physicians of London has recently decided that the terms "membranous laryngitis" and "membranous croup" are not henceforth to be used as synonyms for diphtheria. Until the year 1855 diphtheria was not distinguished from scarlet fever in the returns of the Registrar-General. In 1861–70 there were registered in this country no fewer than 52,545 fatal cases of "croup," but only 39,454 of "diphtheria." If it be assumed that what is commonly called "croup" is a definite disease distinct alike from diphtheria and from spasm of the glottis, it is remarkable that, in spite of the enormous increase of the population, the deaths from "croup" should have fallen from an average of more than 5000 annually in 1851–60 to an annual average of fewer than 600 in the five-year period last ended. When the recorded mortality from diphtheria is combined with that from croup the age-incidence of that mortality in the earlier decennia tallies more nearly with the known incidence of diphtheria at the present day than would have been the case had the formerly predominant factor of croup been left out of account. At the present time the combined mortality from diphtheria and croup is lower than it was 40 years ago.

Enteric fever is one of the diseases the fatality of which has decreased in this country almost *pari passu* with the improvement of local sanitary conditions. Until the year 1868 this disease was grouped with typhus fever and with so-called simple continued fever under the heading "Fever." But in the latest edition of its nomenclature the Royal College of Physicians directs that the names "simple continued fever" and "febricula" should no longer be used. In order to afford graphic illustration of the incidence of enteric fever mortality since 1868 a chart has been prepared for this report showing the corrected death-rates in each of the 37 years elapsed since this disease was first differentiated from other continued fevers. From this chart we learn that the rate of mortality has fallen from 384 per 1,000,000 in the year 1869 to 89 per 1,000,000 in 1905. But although the chart shows a great reduction in the loss of life from this disease it is doubtful whether it fully expresses the amount of that reduction. For whereas in the first quinquennium after 1868 an annual average of 4250 deaths were attributed to simple continued fever, the deaths thus returned in the quinquennium ended 1900 were fewer than 130 annually. There is little doubt, says Dr. Tatham, that many of the deaths referred in 1869–73 to continued fever were really due to enteric fever and the age distribution of these cases tends to support this contention. If this be correct, it follows that in recent years the reduction in enteric fever mortality has been greater than that indicated by the chart.

Pneumonia is one of the important diseases the fatality of which has recently increased considerably. Far greater importance now attaches to the incidence of this disease from the circumstance of its known relation to insanitary surroundings. In the latest edition of its nomenclature the Royal College of Physicians classes lobar pneumonia as a definitely infectious disease and pathologists now generally regard all forms of pneumonia as infective, although the infecting organism is not always the same. In the course of the first three decennia of the past 40 years there appears to have been little change in the mortality ascribed to pneumonia, but in the decennium last ended the rates show a decided increase. Locality appears to influence very seriously the prevalence of fatal pneumonia,

[1] Previous notices of this report appeared in THE LANCET of June 29th (p. 1798) and July 13th, 1907 (p. 105), respectively.

for whilst the mortality from this disease in the urban districts of England averages 1483 per 1,000,000 it does not exceed 849 per 1,000,000 in the rural districts. The disease is everywhere more fatal to the male sex than to the female. As a means of tracing the relation of season to pneumonia fatality the official records for extra-metropolitan England afford no assistance, but the method adopted by the Registrar-General of publishing weekly returns for London offers exceptional facilities for this purpose. Taking the average of the last five years, it appears that in the metropolis 62 per cent. of the deaths from this disease occur in the first and last quarters of the year, taken together, whilst in the remaining half of the year the proportion does not exceed 38 per cent. Another condition of great importance from a public health point of view is that which is known as "puerperal fever," a name disapproved by the Royal College of Physicians—the proper designation being "puerperal septicæmia" or "puerperal pyæmia." The mortality from puerperal fever and other accidents of childbirth has not varied greatly in the course of the last 40 years. In the decennium recently closed the rate was equal to 295 per 1,000,000 of the female population at all ages, married and unmarried together. Expressed in terms of registered births, the ratios in the last four decennia have been 4·69, 4·75, 4·73, and 5·09 per 1000 severally. The mortality was therefore somewhat higher in the recent ten-year period than in any of its three predecessors. This increase, however, is almost certainly due partly to improved certification and partly to the system of inquiry before referred to.

The report before us contains highly interesting references to the behaviour in recent years of certain other prevalent and very destructive diseases; more especially to the several forms of tuberculosis, to cancer, and to the vastly important subject of infantile mortality. In the present article no space remains for adequate notice of these subjects, but we hope to return to their consideration on a future occasion.

## THE NEW BUILDINGS OF ST. BARTHOLOMEW'S HOSPITAL.

ON July 23rd His Royal Highness the Prince of Wales opened the new departments for out-patients at St. Bartholomew's Hospital. The Prince, who is President of the hospital, was accompanied by the Princess and on arrival at the hospital at about 3.30 P.M. was received in the Great Hall by Lord Ludlow (the treasurer), the almoners, Dr. Norman Moore as senior physician, Mr. Harrison Cripps as senior surgeon, the matron, and the clerk. Their Royal Highnesses were conducted to the waiting hall of the new building where the band of the Honourable Artillery Company, which corps also furnished the guard of honour, was in attendance. Here, among others, were assembled the Lord Mayor of London and the Sheriffs, Sir R. Douglas Powell (President of the Royal College of Physicians of London), Sir J. C. Dimsdale, Alderman Sir Thomas Boor Crosby, the members of the medical and surgical staff, and Dr. T. W. Shore, dean of the Medical School.

Lord LUDLOW then addressed the Prince, pointing out how in 1324 Edward II., who before ascending the throne had been the first Prince of Wales, had confirmed the hospital in its property and privileges. The foundation-stone of the present buildings had been laid by His Majesty the King on July 6th, 1904. By the provision of these buildings not only would the out-patients be able to be treated more satisfactorily but also the junior officers of the hospital, the house physicians and surgeons who were in daily and nightly attendance on the patients, would be housed in a satisfactory manner. The treasurer concluded by asking his Royal Highness to declare the building open.

The PRINCE OF WALES, in reply, said: "As President of this ancient and celebrated hospital I have much pleasure in taking part in the ceremony of opening these new buildings, the foundation-stone of which was laid three years ago by the King, and I am glad that the Princess of Wales has accompanied me on what is an important occasion in the history of this institution. It is interesting to note how from the earliest days the British Sovereigns or their families have been personally associated with St. Bartholomew's, and I am proud to think that the presidency so long held by my father should have been continued in me after his accession to the Throne. We have good reason to congratulate ourselves upon the achievement which, thanks to the generous support of the public, we are able to inaugurate to-day, for the building will add greatly to the efficiency of the hospital and will afford the most perfect methods of observation and treatment for out-patients, and will at the same time provide suitable accommodation for those members of the medical staff who by day and night are in attendance on the patients. Better accommodation for the nurses still remains to be provided, and I wish all success to the fund for the erection of a nurses' home which has been started by Lady Ludlow, the wife of our treasurer. I trust that at no distant date this important addition may be carried out. The Princess and I sincerely thank you and all those who work for the well-being of the patients of this ancient and charitable foundation for the kindly sentiments to which your address gives expression, and I have now much pleasure in declaring this building open."

Mr. E. B. I'Anson, F.R.I.B.A., the architect of the new buildings, was presented to their Royal Highnesses and the ceremony of opening terminated.

The Princess of Wales had been elected as a governor of the hospital on June 27th, and the treasurer now asked Her Royal Highness if it were her pleasure to receive her charge. Her Royal Highness having expressed her willingness, the Clerk read the charge as follows:—

May it please your Royal Highness,—Your Royal Highness having been elected and chosen a governor of St. Bartholomew's Hospital, it is your duty and charge to acquit yourself in that office with all faithfulness and sincerity, endeavouring that the affairs and business of the said hospital may be well ordered and managed, and promoting the weal and advantage of the poor wounded, sick, maimed, diseased persons harboured in the said hospital. To this end your Royal Highness is now admitted a governor of St. Bartholomew's Hospital.

The Prince and Princess of Wales inspected the new buildings, a short description of which was given in THE LANCET of July 9th, 1904, on the occasion of the laying of the foundation-stone, and after visiting Mark and President wards in the old buildings they left the hospital.

# Looking Back.

FROM

## THE LANCET, *SATURDAY*, July 25th, 1829.

### PATENT MEDICINE DUTIES AND INFORMERS.

*To the Editor of* THE LANCET.

SIR,—In accordance with the promise I gave you in my last, I now proceed to make a few observations on the "Medicine Stamp Act."

When an informer lays an information, the worthy clerks of the Stamp Office question him as to his name and address, but in a manner which, it is at once convincing enough to the hearer, there is little occasion for. When they make out a "good case," the plan pursued is, to summon the offender to the Court of Exchequer, on such a day, where he is to attend with his solicitor to defend the action, viz., "the Attorney General *versus* Yourself, under a fine of £100." This, Sir, is the puffing summons sent by the Solicitor of Stamps; puffing it may well be called, for it is never put into effect; it acts merely as an organ of terror to the affrighted defendant. Thus do these precious worthies bully and bluster. The defendant, thinking it would be madness to defend an action where the Attorney General is plaintiff, petitions the Commissioners of Stamps for a mitigation of the penalty, (£10), which he almost invariably obtains, to £4.

The following are some of the articles which must bear a stamp:—

1. All patent medicines, numbering 553;* and the apothecary may not sell any small quantity (though not of the original article) under the patent name, without a stamp.

2. No article must be vended to which is prefixed a label describing it to be a specific for any disease, provided the person so vending pretends to any secret science of preparing the same.

3. All lozenges sold with an intent to relieve pain, or remove any malady, excepting ginger and peppermint lozenges; but not those if they are recommended as specifics. All other articles of confectionary may be sold.

4. "The water clause."—Soda, Seidlitz water, and powders,

and indeed any effervescing draught or powder, sold under whatsoever name, or mixed in whatsoever manner.—This is the quibbling clause. An informer comes into your shop, and requests you to make him a dozen soda powders; on your proceeding to stamp them, he objects to it, and begins cursing the Government and stamps altogether, and swears he will not pay threepence for a stamp. I have known an apothecary, ignorant of this quibble, request permission to add a small quantity of magnesia to each powder, supposing this to take off the liability; after a little parleying the informer submits to this, and away he goes and lays an information.

Another quibble is that of coming into the shop and requesting you to give him a quantity of carbonated soda and water; when he has stirred a portion of the soda in the water, he asks for a little tartaric acid to make it pleasant. Having drunk this, the villain runs off to the Stamp Office, and swears you have sold him soda water.

There are many other quibbles which the apothecary must be aware of. I caution every one to be extremely watchful, for informers are ever on the alert. A plan for remedying these evils I will submit for your inspection next week, and am, Sir,

Yours truly,

J. F C.

* This list may be purchased at Shaw's.

# VITAL STATISTICS.

## HEALTH OF ENGLISH TOWNS.

In 76 of the largest English towns 8160 births and 3814 deaths were registered during the week ending July 20th. The annual rate of mortality, which had been equal to 12·5 and 12·3 per 1000 in the two previous weeks, was 12·4 in the week under notice. During the first three weeks of the current quarter the death-rate in these towns, therefore, averaged 12·4 per 1000, the rate in London during the same period being 12·0. The lowest rates in the 76 towns last week were 4·5 in Reading, 4·9 in Burton-on-Trent, 5·7 in East Ham, and 5·9 in Willesden; the rates ranged upwards in the other towns to 17·7 in Liverpool, 18·5 in Merthyr Tydfil, 20·1 in Walsall, and 20·1 in Middlesbrough. The 3814 deaths in the 76 towns showed an increase of 40 over the number in the preceding week, and included 397 which were referred to the principal epidemic diseases, against 366 and 341 in the two preceding weeks; of these, 142 resulted from measles, 107 from whooping-cough, 65 from diarrhœa, 33 from scarlet fever, 31 from diphtheria, and 19 from "fever" (principally enteric), but not any from small-pox. No death from any of these epidemic diseases was registered last week in Willesden, Halifax, Northampton, Hornsey, Rochdale, York, or in nine other of the 76 towns; the annual death-rates from these diseases, however, ranged upwards to 3·1 in Blackburn, 3·3 in Cardiff, 3·9 in Stockton-on-Tees, 4·1 in Middlesbrough, 5·4 in Derby, and 6·0 in Walsall. The 142 fatal cases of measles, were 15 in excess of the number in the previous week; the highest annual death-rates therefrom were 3·1 in Cardiff, 3·9 in Stockton-on-Tees, 4·6 in Derby, and 5·4 in Walsall. The deaths from whooping-cough, which had been 136, 109, and 103 in the three preceding weeks, rose again to 107 last week; the highest rates from this disease were 1·1 in Salford and in Huddersfield, 1·2 in Wigan, and 1·6 in Brighton. The 65 fatal cases of diarrhœa exceeded by 26 the number in the previous week, the highest rates of mortality being 1·2 in Walthamstow, 1·7 in Barrow-in-Furness, and 2·0 in Middlesbrough. Scarlet fever caused a death-rate of 1·5 per 1000 in West Bromwich, and diphtheria a rate of 1·3 in Norwich. There were two deaths from "fever" in London, two in Liverpool, two in Sheffield, and one in each of 13 other towns. No case of small-pox has been under treatment in the Metropolitan Asylums Hospitals for the past ten weeks; the number of scarlet fever patients in these hospitals and in the London Fever Hospital, which had risen from 2658 to 3276 in the ten preceding weeks, had further increased to 3387 at the end of last week; 570 new cases were admitted during the week, against 422, 504, and 493 in the three preceding weeks. The deaths in London referred to pneumonia and other diseases of the respiratory organs, which had been 156, 148, and 139 in the three preceding weeks, further declined to 126 last week, and were nine below the corrected average number in the corresponding week of the five years 1902–06. The causes of 35, or 0 9 per cent., of the deaths registered in the 76 towns during the week were not certified, either by a registered medical practitioner or by a coroner. All the causes of death were duly certified in London, Manchester, Leeds, Bristol, West Ham, and in 50 other of the 76 towns; the proportion of uncertified deaths, however, showed considerable excess in Liverpool, Birmingham, Sheffield, Portsmouth, Rochdale, Grimsby, and Rotherham.

## HEALTH OF SCOTCH TOWNS.

The annual rate of mortality in eight of the principal Scotch towns, which had declined from 17·3, to 13·7 per 1000 in the four preceding weeks, rose again to 14·9 in the week ending July 20th, and was 2·5 per 1000 in excess of the mean rate during the same week in the 76 large English towns. The rates in the eight Scotch towns ranged from 9·6 in Aberdeen and 11·2 in Leith, to 17·6 in Dundee and 18·0 in Perth. The 518 deaths in the eight towns showed an increase of 43 over the number in the preceding week, and included 63 which were referred to the principal epidemic diseases, against 59 and 60 in the two previous weeks. These 63 deaths were equal to an annual rate of 1·8 per 1000, which exceeded by 0·5 per 1000 the rate from the principal epidemic diseases in the 76 English towns; they included 23 which were referred to whooping-cough, 19 to diarrhœa, 14 to "fever," and seven to measles, but not any to small-pox, scarlet fever, or diphtheria. The fatal cases of whooping-cough, which had been 18 and 22 in the two previous weeks, further rose last week to 23, of which nine occurred in Glasgow, five in Edinburgh, three in Leith, two in Dundee, and two in Paisley. The deaths referred to "fever," which had been 21, 18, and 14 in the three preceding weeks, were again 14 last week, and included seven which were attributed to cerebro-spinal meningitis in Glasgow, three in Edinburgh, and one in Leith. The fatal cases of diarrhœa, which had been 10 and 12 in the two preceding weeks, further rose last week to 19, of which seven occurred in Glasgow, four in Edinburgh, four in Dundee, two in Paisley, and two in Greenock. Of the seven deaths from measles six were returned in Glasgow. The deaths in the eight towns referred to diseases of the respiratory organs, including pneumonia, which had been 72, 80, and 88 in the three previous weeks, declined again to 72 in the week under notice, but exceeded by eight the number in the corresponding week of last year. The causes of 24, or 4·7 per cent., of the deaths registered in the eight towns during the week were not certified or not stated; in the 76 English towns the proportion of uncertified deaths did not exceed 0·9 per cent.

## HEALTH OF DUBLIN.

The annual rate of mortality in Dublin, which had been equal to 19 5, 18·3, and 21·0 per 1000 in the three preceding weeks, further rose to 21·5 per 1000 in the week ending July 20th. During the first three weeks of the current quarter the death-rate has averaged 20·3, the rates during the same period being 12·0 in London and 14·1 in Edinburgh. The 161 deaths of Dublin residents registered during the week under notice showed an increase of four over the number in the previous week, and included five which were referred to the principal epidemic diseases, against 19 and 14 in the two preceding weeks; of these, four resulted from whooping-cough and one from "fever," but not any from small-pox, measles, scarlet fever, diphtheria, or diarrhœa. These five deaths were equal to an annual rate of 0·7 per 1000, the rate during the same week from the principal epidemic diseases being 1·5 in London and 1·7 in Edinburgh. The fatal cases of whooping-cough, which had been nine and seven in the two previous weeks, showed a further decline to four last week. The 161 deaths from all causes in Dublin during the week included 32 of children under one year of age and 49 of persons aged upwards of 60 years, each of these numbers showing a further increase upon those returned in recent weeks. Eight inquest cases and seven deaths from violence were registered; and 59, or 36·6 per cent., of the deaths occurred in public institutions. The causes of seven, or 4·3 per cent., of the deaths in Dublin last week were not certified; in London the causes of all the deaths were duly certified; while in Edinburgh the percentage of uncertified deaths was 2·0.

## THE SERVICES.

ROYAL NAVY MEDICAL SERVICE.

THE following appointments are notified:—Fleet-Surgeons: O. W. Andrews to the *President*, additional, for Deptford Victualling Yard, temporary; J. A. Moon to the *Prince of Wales;* W. G. Axford to the *Magnificent;* H. W. A. Burke to the *Wildfire* and for Sheerness yard; and J. Menary to the *President*, additional, for three months at West London Hospital. Surgeons: S. F. Dudley to the *Queen;* O. Mills to the *Donegal;* and N. H. Harris to the *Defiance*.

In accordance with the provisions of Her late Majesty's Order in Council of April 1st, 1881, Fleet-Surgeon Thomas Edward Henry Williams has been placed on the Retired List at his own request, with permission to assume the rank of retired Deputy Inspector-General of Hospitals and Fleets (dated July 12th, 1907).

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Edwin O. Milward is placed on retired pay (dated July 24th, 1907).

ARMY MEDICAL RESERVE OF OFFICERS.

Surgeon-Lieutenant Henry G. Smeeth to be Surgeon-Captain (dated July 6th, 1907).

IMPERIAL YEOMANRY.

Lancashire Hussars: Surgeon-Major and Honorary Surgeon-Lieutenant-Colonel D. Harrisson to be Surgeon-Lieutenant-Colonel (dated June 9th, 1906), and to be granted the honorary rank of Surgeon-Colonel (dated June 20th, 1907). Surgeon-Lieutenant-Colonel and Honorary Surgeon-Colonel D. Harrisson resigns his commission, with permission to retain his rank and to wear the prescribed uniform (dated June 21st, 1907). Lincolnshire: Robert Black Purves (late Surgeon-Captain, 1st Edinburgh (City) Royal Garrison Artillery (Volunteers)), to be Surgeon-Lieutenant (extra) (dated May 14th, 1907).

VOLUNTEER CORPS.

*Rifle:* 2nd Volunteer Battalion, the Manchester Regiment: Surgeon-Major George Henry Darwin, retired, to be Surgeon-Major (dated Oct. 30th, 1906).

THE FATHER OF KAID SIR HARRY MACLEAN.

The following interesting paragraph is taken from the *Army and Navy Gazette* of July 20th: "Those who knew Deputy Inspector-General Andrew Maclean in the days when he did duty as a medical officer on the staff of the army will be glad to learn that the veteran soldier has recovered from his illness and is in as good a state of health as can be expected having regard to his advanced age—he has reached his ninety-fifth year. He is father of Kaid Sir Harry Maclean, whose captivity has naturally occasioned him anxiety. Dr. Maclean lives in the neighbourhood of Kew Gardens, and was until recently to be seen taking his daily walk with little outward evidence of age or infirmity."

## Correspondence.

"Audi alteram partem."

### EXPERIMENTS ON PROLONGED PROTEIN FEEDING.

*To the Editors of* THE LANCET.

SIRS,—In a very interesting and instructive paper on the above subject, published in THE LANCET of July 20th, Dr. David Forsyth has discussed at some length some views which I have recently advanced as to the relationship of diet to the thyroid gland, based on the results of an experimental investigation into the effects of an excessive meat diet in animals. As I think that Dr. Forsyth has unwittingly given an erroneous impression of the results recorded in my paper and of my interpretation of them, I would like with your permission to offer a few very brief comments on his paper.

Dr. Forsyth is, I think, hardly correct in stating that he has repeated my observations. His experiments differed from mine in two important particulars. My experiments were directed to ascertain the effects of an exclusive meat dietary and the food was given in an uncooked condition in order that all the nutritive juices and soluble salts of the meat should be consumed by the animals. In his experiments Dr. Forsyth supplemented the meat diet by the addition of inorganic salts and possibly other foodstuffs, and the meat was cooked, the water used in the cooking not being utilised for the feeding of his animals. At the meeting of the Physiological Society in November, 1905, at which the fowls fed by Dr. Forsyth were exhibited, I was much struck by the difference in the dietetic conditions in his observations and mine.

With regard to Dr. Forsyth's interpretation of the changes in the thyroid and parathyroid glands recorded by me, I fear that his presentation of my results and my interpretation of them has been unconsciously coloured by his desire to harmonise my results with his theories. The possible fallacies suggested by Dr. Forsyth were not unknown to me, and I am satisfied that they do not affect the results. It is true, as Dr. Forsyth points out, that the weights of the glands recorded in my paper are not as complete as they should have been. This is accounted for by the fact that my research was primarily an experimental investigation into the nature of avian gout and the changes in the thyroid and parathyroid glands were, so to speak, an accidental finding, and two out of the three greatly enlarged glands were partially utilised for sections before the probable significance of the enlargement was appreciated. Since the thyroid glands in all three fowls were at least eight times larger and heavier than the glands of a control animal of similar weight, and as this condition was associated with an equally striking enlargement of the parathyroid glands, it did not seem to be possible to arrive at any other conclusion than that arrived at, and I am still of this opinion.

In his paper Dr. Forsyth suggests that the possibility of a deficiency in inorganic material in a meat diet being an important factor in such experiments was first brought to my notice when my paper was discussed at a meeting of the Pathological Society of London. This is not the case. My original investigation was undertaken in order to confirm or otherwise the results of an interesting series of experiments by Kionka on avian gout induced by meat feeding, which were published in 1900, and are referred to in my original paper. In his writings Kionka not only makes a special reference to the deficiency of lime in a meat diet but his main paper is followed immediately in the same journal by a second communication dealing exclusively with the influence of lime in his experiments. In my later feeding experiments with rats referred to by Dr. Forsyth my object was to repeat as closely as possible the dietetic conditions obtaining in my earlier observations. I have elsewhere pointed out that the consideration of the ultimate causes of the structural changes observed—whether due to excess or deficiency of particular foodstuffs in a meat diet—was beyond the scope of my recent communications.

May I, in conclusion, offer one comment on the very interesting facts recorded by Dr. Forsyth in that section of his paper dealing with the structure of the thyroid gland in birds of prey. I was specially interested in the five different types of glands which are shown in his illustrations, as characteristic of the eagle, ostrich, falcon, &c., but I have doubts as to the validity of the conclusions he draws from them. An extensive experience of the histology of the thyroid gland of animals under different conditions leads me to think that more than one of the five appearances illustrated are pathological and are the results of the disturbed state of general nutrition which has led to the tissue being available for examination by Dr. Forsyth. I am strengthened in this view by the fact that I can show, from some unpublished data on the thyroid gland of experimentally-fed cats, appearances apparently identical with those described by Dr. Forsyth in the five different species of birds, the appearances in my sections being obtained under conditions which leave no room for doubt, in my mind at any rate, as to their having an important etiological relationship to dietetic conditions.

I am, Sirs, yours faithfully,

July 20th, 1907. CHALMERS WATSON.

### ATHLETIC CHAMPIONSHIPS AND NATIONAL PHYSICAL DEVELOPMENT.

*To the Editors of* THE LANCET.

SIRS,—In your leading article on the above subject you refer to "the winning of the Grand Challenge Cup at Henley for the second year in succession by a Belgian crew, the recent victories of colonial football players, the success of M. Massey at golf, of Mr. Gould at tennis, and of Mr. Brookes at lawn tennis"; and you express a doubt as to

whether these and "other similar incidents of athletic competition" justify us in concluding that there is "a falling off in the physical energy of the nation." Why, you ask, should not others learn to play as well as, or better than, ourselves the games we have invented? Speaking generally, there is, indeed, no reason why they should not. By the law of averages we must expect to suffer our due share of defeats. If, however, these are greatly in excess of what can be accounted for by the law of averages clearly some disturbing factor or factors must be in operation.

Viewed thus, I find nothing remarkable in the recent victory of the Belgians, or of M. Massey, or Mr. Gould, or even of Mr. Brookes. Such successes are sufficiently explicable by the law of averages. The successes of the colonials in football and cricket strike me, on the other hand, as very remarkable, inasmuch as they are far in excess of what by the law of averages we should expect. The colonial record in the sphere of football and cricket is, indeed, phenomenal. Putting aside the extraordinary feats of the Australian cricketers who are drawn from a population of less than 4,000,000, let us consider the recent records of the New Zealanders and South Africans in football and cricket. Although the population of New Zealand is considerably under 1,000,000, while that of England is upwards of 32,000,000, the New Zealanders had no difficulty in defeating here in England every 15, including an all-England team, which we opposed to them. The South Africans, again, representing a population of less than 750,000, had an equally brilliant record. In each case the colonial successes were due to consistent all-round merit—to a combination of skill, dash, and endurance. Not only did the best teams we could put in the field go down before our adversaries, but the representative teams of the ancient universities, containing the flower of our English youth, were altogether outplayed by them. It has long been our proud boast that our battles have been won in the playgrounds of our public schools, the inference being that all the qualities which make for virility are cultivated there, but seeing that our ancient universities are fed mainly from the public schools it looks very much as though these latter were turning out a less virile stuff than that furnished by the colonies.

Excellence in a game such as Rugby football demands a certain toughness of fibre, and it is perhaps largely for this reason that the Welsh teams, composed as they mainly are of men who live by physical labour, were so much more successful against the colonials than the English teams, which are drawn chiefly from the upper middle class, reared under conditions which, as it seems to me, make for "softness." In this connexion the superiority of the golf and cricket professionals over the amateurs is of interest. Amateur golfers and first-rate amateur cricketers are drawn almost entirely from the upper middle class, while the professionals, both in golf and cricket, are, I understand, derived for the most part from the so-called "working" classes. Now can we wholly explain the superiority of the latter on the assumption that they devote more time and care to the game which they have made a profession than the amateurs who indulge in it as a pastime only? This is at least doubtful. As regards golf, e.g., the amateur players in England are much more numerous than the professionals. Many of them, moreover, begin to play when quite young and devote quite as much time to the game as the professionals. How comes it, then, that the latter show a consistent superiority over the former? I suggest that it is partly due to the possession of greater staying power and partly to a richer endowment of "nerve," or shall we call it imperturbability?

Both these qualities have been conspicuous in the South African cricketers, whose recent successes in this country are perhaps even more remarkable than their brilliant achievements in the football field. Think of it. A colonial community of less than 750,000 sends to us, with our population of upwards of 32,000,000, a team to compete in our national game—our most typically national game—cricket, and displays not only a decided superiority over our county teams, but bids fair to hold its own against a representative English eleven chosen from both professionals and amateurs. There is, perhaps, no game which makes greater demands on what may be termed manly excellence than cricket, requiring as it does not only muscularity, agility, and endurance, but judgment, decision, patience, good temper, unselfishness, and "nerve." No one, indeed, who does not exhibit the best qualities of manliness is likely to make a good cricketer. All these qualities our brothers from over the seas have displayed in a remarkable degree, and it seems difficult to avoid the conclusion that the conditions under which they live are more favourable for the development of some of them, especially perhaps of endurance and nerve, than the conditions obtaining in this country. They seem in Greater Britain to be breeding a hardier and more virile race than in the mother country, and it is probable that, given equal opportunity, the same superiority which the Australasians and South Africans have displayed in cricket and football would be equally manifest in tennis, polo, and other games of the kind.

I am, Sirs, yours faithfully,

Wimpole-street, W., July 21st, 1907. HARRY CAMPBELL.

PS.—I see in this morning's paper (July 22nd) under the heading "A Trial of Nerve" that the King's Prize has been won by an Australian. This, coming on top of Mr. Brookes's successes, is noteworthy.

## THE CORNEAL REFLEX IN ANÆSTHESIA.

*To the Editors of* THE LANCET.

SIRS,—In the issue of THE LANCET of July 20th, 1907, on p. 141, occurs a sentence which involves a change of view of the most vital and lasting importance. In the course of a lecture on General Surgical Anæsthesia Dr. F. W. Hewitt thus expresses his carefully considered opinion with regard to the clinical signs when using chloroform or a chloroform mixture. "Provided that the respiration be freely proceeding and *that the corneal reflex be present* even to a slight degree, the patient's general condition at the moment of observation may be regarded as satisfactory." In the edition of his work on "Anæsthetics and their Administration," published in 1901, Dr. Hewitt said, referring to chloroform, p. 336, "The lid-reflex should, as a general rule, be absent ..... the third degree of anæsthesia cannot, generally speaking, be said to be present when this phenomenon can be elicited," and again on p. 363, "In many cases a trace of this reflex may be permitted but there are numerous subjects and numerous operations in which both corneæ must be kept absolutely insensitive throughout."

Dr. Hewitt's latest opinion coincides with the view which I ventured to record in the *British Medical Journal* on Feb. 4th, 1905, in these words, p. 245: "Never completely abolish the corneal reflex. The corneal reflex, which is produced by touching the centre of the patient's cornea and both watching and feeling the responsive closure of the upper eyelid, is one of the last primary reflex actions to become paralysed. When this has been abolished the fourth stage of dangerous anæsthesia has been entered."

I do not say that it is possible always to avoid the momentary disappearance of the corneal reflex, but that the third stage or that of surgical anæsthesia is limited, and should be taught as being limited, by the abolition of the corneal reflex in both eyes. Differences of opinion which may be expressed with regard to this conviction are more likely to depend upon imperfect methods of eliciting this reflex than upon disbelief in its truth, the accuracy of which is founded upon continual daily observation.

I am, Sirs, yours faithfully,

Harley-street, W., July 23rd, 1907. H. BELLAMY GARDNER.

## THE INTRODUCTION OF THE METRIC SYSTEM INTO PHARMACY.

*To the Editors of* THE LANCET.

SIRS,—Several circumstances indicate that the time has come for introducing metric weights and measures into the medical practice of this country. That system became legal in Great Britain a few years ago and no other is now permitted in the pharmacopœias of any civilised country except Great Britain which, however, has begun to print the new and old side by side.

The disciplinary and regulating body of the British medical profession, that is to say, the General Medical Council, has recently gone further than the Pharmacopœia by recommending, after a unanimous vote, that the metric system be made compulsory by law for everybody in all bargains and sales where weight or measure is specified. A Parliamentary majority of two to one was pledged in writing to support a Bill to this effect, but it was defeated by 150 to 118 votes, mainly through opposition from the textile trades, which

erroneously imagined that the Bill applied not merely to the sale of goods but to machinery and factories. A few days before this debate Denmark adopted the metric system for all purposes, so now England and Russia alone stand aloof in Europe.

All Southern and Central America have followed the example of Europe and the United States have commenced by making this system compulsory for electric measures, also in the medical department of the army, the navy, and public health. It is also obligatory for all purposes in Porto Rico and the Philippines.

Official reports show that this change has been wholly beneficial in the United States, even where civilians experienced only in the old system were hastily brought into the army and navy medical services during the recent war with Spain. The colonies have urged Great Britain to join them in the reform and will probably act alone, if necessary, as New Zealand has already legislated on the subject. As regards the medical services of the army and navy in this country Government could take immediate action without reference to Parliament and with the same advantages which followed in the United States. The result would probably encourage concerted voluntary action among medical men in civil life who might collect and record the names of adherents through a central committee. A commencement of metric practice might be delayed till a convenient percentage of names in any district or throughout the country were recorded.

I am, Sirs, yours faithfully,

July 22nd, 1907. T.

## CERTIFYING SURGEONS AND THE WORKMEN'S COMPENSATION ACT, 1906.

*To the Editors of* THE LANCET.

SIRS,—Having just received from the Home Office documents respecting the duties and remuneration of certifying surgeons under the Workmen's Compensation Act, 1906, I shall be glad to know the opinion of certifying surgeons as to whether they consider the fees are such as should be accepted by self-respecting medical men and, if not, what steps can be taken in the matter. In the circular from the Home Office it points out that "the certificates are legal documents which will require great care in completion." I gather the fee for this legal document is *one shilling*, which includes a responsible and skilled examination, but the details are chiefly given in Section 8 and Sub-section 3 of the Workmen's Compensation Act, 1906.

I am, Sirs, yours faithfully,

July 16th, 1907. CERTIFYING SURGEON.

*** We comment upon the matter in another column.—ED. L.

POPLAR AND STEPNEY SICK ASYLUM DISTRICT.—The report of the managers of the Poplar and Stepney Sick Asylum District for the year ending Lady-day, 1907, shows that the total number of patients in the various asylums of the district at the close of the period with which the report deals was 926. In the Bromley asylum the patients from Poplar suffering from cancer of various regions numbered 44, while patients from Stepney suffering from the same disease numbered 20. During the year 18 nurses presented themselves for, and successfully passed, the examination in sick cookery in connexion with the cookery classes held under the auspices of the Technical Education Board of the London County Council. The medical superintendent reports that the first year's working of the new system under which case papers were substituted for the cumbrous system of medical relief books has been a great improvement upon the old method. Under an Order issued by the Local Government Board in 1905 the medical superintendent has the option of either having the case paper, upon which appear the diet, medicine, history, and all information regarding the patient, hung by the bedside, or else of having in addition to the case paper a bed card upon which is written by the nurse the diet prescribed for the patient, together with other useful information. The latter of these alternatives was chosen in the present instance and the results have proved very satisfactory. The case papers, which are kept under lock and key, have been specially useful in cases where patients previously treated present themselves for readmission.

## THE IRISH INTERNATIONAL EXHIBITION.

(FROM OUR SPECIAL SANITARY COMMISSIONER.)

Dublin, July 13th, 1907.

THOUGH the Dublin exhibition is called the Irish International Exhibition the international element is very small and unimportant. On the other hand, as Ireland is not a populous or industrial or wealthy country it naturally follows that the Irish exhibits are also somewhat poor. They are, nevertheless, interesting; they testify that efforts are being made and that these might be far more successful if the Irish could only receive a more business-like education and acquire greater technical knowledge. These considerations have a considerable bearing on the health and vitality of the race, particularly as such industrial efforts as have been made relate in the main to the production of food and of clothing. However, the most notable Irish industries have a building to themselves on one side of the grounds and it is the Central Palace that seems the most important and first attracts the visitor, if for no other reason than that it has been made the principal subject of the illustrated advertisements. Yet the middle of this building is a huge sort of meeting place and lounge where there are but few exhibits. The four wings, however, of this the main structure are well filled. Penetrating first the north wing I found a considerable amount of Irish and other furniture. The idea of sanitary furniture constructed for its own sake or specially for use in the hotels of the Touring Club and which was such an interesting feature at the Milan Exhibition last year has not yet travelled so far as Dublin. Nevertheless, as we more clearly understand the causes of the spread of disease something approximating to aseptic furniture will become more and more appreciated, especially in hotels and places frequented by a great variety of people. At several exhibitions I have noticed furniture of this description, but I found none at Dublin.

In the east wing there were a great display of whiskies and notably a huge pot-still belonging to the firm of John Power and Son which was established in Dublin in 1791. The statement made is that this whisky "is distilled in a pot-still from the wash derived from the fermented worts of home-grown malted and unmalted barley, with wheat and oats in small proportion." Close by, and as if suggesting an antidote, Augustine Thwaites has a model of the quaint little old house where in 1773 soda water was first made. In the window there is the old ledger opened at the page where the account was kept of the amount of soda water supplied to His Majesty George IV. Then again, likewise surrounded by other whisky exhibits, I found Wheatley's non-intoxicants, hop-bitters, &c. These were bottled and looked very much like ordinary ales. Here, also, were numerous tobacco exhibits, and tobacco is often as injurious, when smoked in excess, as beer, but this does not prevent many total abstainers from suffering the evil effects of tobacco.

In the south wing there were more tobaccos and more mineral waters, including the French Perrier water. Then there were meat preparations, such as Bovril soup and Brand's various delicacies and invalid foods. Levers' soaps, Price's patent candles, and Fry's chocolates came next, though it is difficult to see what connexion there can be between them. In the same wing Philip Harris and Co. of Dublin exhibit their scientific instruments, scales, thermometers, and electrical and chemical appliances of all sorts. As scientific exhibitors they would be quite isolated but for the proximity of John Clark and Co. of Dublin and Belfast who display surgical instruments, orthopædic appliances, hospital furniture, &c. As special to Ireland there are Irish linen bandages, the edges of which are woven so that they are very durable. The same firm has a high-pressure steam steriliser consisting of double copper cylinders and an outside jacket of Russian steel. It condenses its own steam and a pressure of from 15 to 40 pounds can be obtained according to the manner in which the safety valve is regulated. These are the only sterilisers made in Ireland and are becoming more and more an article of general use.

The west wing is mainly devoted to clothing. There are Killarney rugs and cloth made of pure wool, doubtless very warm and healthy to wear, but there is no clothing that professes to be sanitary clothing and even the non-inflammable flannelette, seen at almost all exhibitions, is not in evidence

here. There is also some display of hats, old and new, and notably the very tall silk hat worn by O'Connell in 1840; but no one has attempted to solve the problem of ventilating these very uncomfortable and heavy forms of headgear.

On the right of the Central Palace there is an oblong building called the Palace of Industries, and here, among other things, is the New Zealand section. Both here and in the very elaborate and special pavilion built for the Canadian exhibits the first impression is that these colonies are doing just what should be done with special success in Ireland itself. Both exhibits have refrigerators and through the glass panes can be seen the fresh butter, the poultry, and the frozen meat. So much butter is there from Canada that it has been moulded to represent a Canadian farm, the chickens made of butter that play about in the foreground being life size. Then there are pyramids of cheese; in fact, the very things that could be most abundantly produced in Ireland itself. There is a small working model of a section of the R.M.S. *Papanui* in the New Zealand section. This shows how thousands of carcasses of sheep can be laid in the hold of the ship and how the fans propel cold air over them, so that they are preserved during the long journey to England, and the machine lifts to bring them up to the landing stage with the minimum of effort. All this is interesting as indicating the increased sources of food-supply so essential to the health of the community. There is also a considerable collection of mineral waters from New Zealand. Many of the springs known to exist have not yet been analysed. Others have been carefully examined and placed forthwith under Government control. These springs and baths are entrusted to the supervision of Dr. Arthur S. Wohlmann who represents the Government. Some of these are alkaline sulphur, bathing and drinking waters, and are credited with having effected numerous cures, not only of the inhabitants of New Zealand but of patients arriving from distant parts. There are also blankets, cloth, and rugs made in New Zealand. Some of the woollen rugs are especially fine, with beautiful colours, designs, and finish. As non-conductors of heat, cold, or electricity, such woollens are especially useful to invalids. Close by the New Zealand section is the curious exhibit of Lovibond's patent tintometer, an instrument and system of developing and noting the quality of colour. This method of analysing, accurately measuring, and recording the density, shade, and colour is applied not only to numerous industrial purposes but to the blood of man and animals and is therefore occasionally of use in the diagnosis of disease. In conversation with Mr. Lovibond I elicited a curious piece of information. In his process a great number of small glass slides are employed and these are tinted various shades of red, blue, and yellow. Seven young women are engaged at this work; and in the course of years some 30 to 40 women have been so employed. The preparation of these pieces of glass is identical whatever the colour, yet those who work with the red glass are very soon tired and exhausted. This is so well recognised a fact that no one is allowed to work with the red colour for a long time. Near at hand there is a large model of one of the Gilbey vineyards in the Bordeaux district with two fine white bullocks dragging a cart loaded with grapes. The Irish profess to be connoisseurs of claret. They say that their climate favours the maturing of such wine and maintain that Napoleon himself was supplied with claret from a Dublin cellar. In any case, Messrs. W. and A. Gilbey are making good use of the publicity which the exhibition gives to popularise in Ireland the use of wholesome cheap clarets which are certainly very preferable to the questionable spirits sold too often under the name of whisky.

There is besides a small French section where the wine-growers of France exhibit samples; there are also cognacs, liqueurs, and champagne in this section. The Vichy waters and salts have a large case and there is a collective pharmacy exhibit where some of the best known wholesale druggists have sent many of their products. Then Dr. Madeuf, who has never been known to miss an opportunity of bringing forward the claims of his League for the Prevention of Sea Sickness, is here with a big display of literature on this subject. In this section there are also catguts for ligatures, &c., produced by the very ingenious Triollet process which insures sterilisation without destroying the flexibility or suppleness of the catgut or hindering its ready absorption.

In the gardens there are several small structures, one specially devoted to Lemco and Oxo and another to Chivers's jellies and jams. Then there is a pavilion for "Working Exhibits," where men and women are at work making cloth, carpets, lace, boots, gloves, &c. Most of these are home industries, the sort of work that can be done in a cottage, and on the walls there are photographs of workers on the continent similarly employed. Thus we see shirt-makers and boot-makers in France stated to be earning from 2 to 3 francs per day, and glove-makers only 1.50 francs. They all look very tidy and evidently impressed with the fact that they were being photographed. The Belgian workers make a more general use of aprons and therefore look even more tidy. Only one of these photographs is realistic, and that is of a German corset-maker who earns one mark per day. Here, in the crowded little room, the corset trimmings are spread over slop-pails and washing-basins, and this does convey some idea of the dangers to health caused by the home work and sweating systems. Otherwise these photographs—as, indeed, the whole of this sort of exhibits—convey very false impressions and can best be compared to the happy and picturesque peasants who sing in the chorus of an operatic scene.

Next to this pavilion comes a model village hall which is perhaps more satisfactory than its neighbour the model village hospital. Not so much is needed in a hall only occasionally occupied to the full. The hall of wood and corrugated iron seems ably contrived and a fair provision is made for ventilation. But the idea of a hospital made of wood and iron is not so happy. On entering to the right there are a small nurses' sitting-room and pharmacy. Here on the walls are hung proclamations issued by the National Association for the Prevention of Tuberculosis. On the other side of the entrance is a small nurses' bedroom, with just one chair, a washstand, a chest of drawers, and a camp bed. Next to this is a small operating-room, with only one small window and wooden walls. Yet to judge by the operating table and instruments supplied by Messrs. Fannin and Co. of Dublin it seems intended that major operations should be performed here. In the back part of the cottage there is a small service bedroom giving on to a fairly large kitchen, with a scullery and pantry beyond. Finally, in a sort of passage there are two closets, a bathroom, and a nurses' sink. So much for the services. As for the patients there are only two rooms available for them and these are so small that they can only hold two patients each. To build a hospital, even be it but a cottage hospital for only four patients, is certainly a difficult matter.

Opposite there is a cottage made of hollow concrete blocks. The "Pioneer" machine produces these blocks, and they resist fire, are durable, and can easily be moulded into very artistic designs. By the side of this there is another cottage, with living-room and three small bedrooms, which can be built for £135. Such extreme cheapness should not be necessary and in any case sufficient space cannot be obtained at the price.

The largest building of the exhibition is undoubtedly the spacious gallery called the Palace of the Mechanical Arts. Here there are some large machinery and some exhibits that would interest hygienists, such as E. Green and Son's Economiser Works of Wakefield as a contribution to the problem of warming buildings; Shanks and Co.'s porcelain baths and sanitary hardware; and the immense exhibits of the Carron Company with numerous firegrates, kitcheners, baths, &c. Opposite this are the exhibits of the great liners of the Cunard, the White Star, the Booth, and other popular passenger companies. The problem of ocean travelling is a fascinating one to all who have practical experience of its intricacies and the beautiful models shown here facilitate its study. The models of the most recently constructed ships can be examined here, such as the huge 32,000 ton Cunarders and the new Booth Line ship *Lanfrang*. The latter takes health-seekers to the winter resorts which the Portuguese are endeavouring to develop.

In the machine gallery and in various parts of the exhibition there is a considerable assortment of the machinery and numerous appliances that are employed in creameries and dairy farms generally. This, it need hardly be said, is a matter of great importance to a country like Ireland which should produce an enormous amount of milk, butter, and cheese. His Majesty King Edward VII. has this week visited all these exhibits. His presence and the immense enthusiasm of the reception given should help the cause that the Dublin exhibition is meant to promote—namely, the development of industry and technical knowledge in Ireland.

## BIRMINGHAM.

(FROM OUR OWN CORRESPONDENT.)

*The University.*

DISTINCTION has recently been conferred upon two members of the University, the Principal, Sir Oliver Lodge, having received the honorary degree of D.Sc. of the University of Liverpool, and Professor Fiedler having been elected to the recently established professorship of German language and literature in the University of Oxford. As Professor Harvey Gibson pointed out, Sir Oliver Lodge was entitled to the highest distinction which the University of Liverpool could confer upon him, not only on account of the work which he previously did for University College but also on account of the distinguished position that he has made for himself as a leader in science. Fortunately Sir Oliver Lodge remains in Birmingham but in the case of Professor Fiedler, though we are glad that he has been appointed to so distinguished a position, we cannot help regretting that his appointment will make us the poorer by the loss of the example of his unremitting energy, his genial good fellowship, and his active sympathy and help in any work which required doing. During his tenure of office in Birmingham Professor Fiedler has not only advanced and extended his department but he has acted as chairman of the library committee and for some years he has been Dean of the Faculty of Arts. Oxford gains much by his appointment and Birmingham will not find it easy to replace a professor who has gained so great a hold both on the students and on the people of the city.

*The Society of Chemical Industry.*

The meeting of the Society of Chemical Industry recently held in Birmingham passed off very successfully. Fortunately the society came with the coming of the fine weather; consequently the excursions took place and garden parties were held under favourable conditions and the visitors saw Birmingham not quite at its best but in more favourable circumstances than had previously been experienced during this summer. At the general meeting, held in the medical theatre of the University, the Lord Mayor welcomed the visitors to Birmingham and the Principal, Sir Oliver Lodge, proffered the welcome of the University. Mr. Eustace Carey of Liverpool, the president of the society, delivered the presidential address, in the course of which he stated that the last 20 years had been a period of depression in the alkali trade and he attributed this to three causes: (1) the failure in giving and the failure in appreciating education; (2) the failure of the British patent law; and (3) the loss of markets due to the protection and tariffs adopted by old and important customers. With regard to education, however, he saw signs of improvement in this country in all grades and he had hopes with regard to the patent law which, it is hoped, will be passed in a short time. At the banquet of the society Sir Oliver Lodge pointed out that one of the things wanted in this country was an appreciation of university training by employers such as was said to exist in Germany, for without it the work of the universities in turning out well-equipped and well-trained men was comparatively useless. The last two days of the meeting were devoted partly to excursions to places of practical and scientific interest in the city and in adjacent parts of the country and partly to visits to the beauty spots of the neighbourhood. In the evening of the last day a garden party was held in the Botanical Gardens which were beautifully illuminated for the occasion. The guests were received by Professor and Mrs. Frankland, and were entertained with delightful music and by a magnificent display of fireworks.

*Municipal Milk Depôts.*

In its quarterly report the health committee states that after carefully considering the question in all its bearings the committee is unable to recommend the council to establish milk depôts. It points out that there is no satisfactory evidence that the establishment of such depôts has any appreciable effect on the infantile mortality, for the statistics which have been prepared to show that the infant death-rate is reduced by the utilisation of milk depôts are, it considers, open to objection and the good results which have been noted are possibly due to other causes.

*Open Spaces.*

In the first instance everything seemed to be going favourably with regard to the series of open spaces which the Birmingham Open Spaces Society desired the city to obtain and to maintain for its own general advantage. So far as the Black Patch is concerned Smethwick and Handsworth, in whose district it partly lies, are prepared to provide a considerable part of the purchase money, but they are not willing to undertake any responsibilities as to upkeep, and, of course, all the cost of the other sites at present available must fall upon the city. The whole matter was referred to the Baths and Parks Committee for a report as to cost and advisability, and the report is unfavourable. Without considering the cost of purchase, about which there would be little or no difficulty, the committee estimates that to put the Black Patch in proper order a sum of over £10,000 must be provided and the annual expenses would be about £1450. The cost of converting the other plots offered would amount to £1835 and the total capital cost including the balance of purchase money (£4000) and additional provisions which the committee suggests as desirable would be, in the committee's opinion, at least £15,950. In these circumstances the committee is of the opinion that the advantages to be gained do not justify the cost and it cannot recommend the council to accept the offers made. What the council will decide remains to be seen, but it may be pointed out that the committee's estimates of what it would be necessary to do, though perfectly justifiable and highly desirable, are possibly in excess of present requirements, and if it is a question of getting these spaces now or losing them for ever, it would surely be wise in the city's interests to secure spaces which are so necessary, to do nothing more to them than necessity compels at present, and to develop them as opportunity offers in the future. If they are secured as spaces they will be a valuable asset to the crowded areas and they can be retained as "lungs" for children, who can easily make themselves happy in the absence of all elaborate arrangements.

*Presentation to Mr. W. F. Haslam.*

For a period of 16 years Mr. Haslam acted as secretary of the Midland Medical Benevolent Society and the members, taking advantage of his recent resignation of the post, have presented him with a silver tea- and coffee-service, kettle, and rose bowl as a token of their very high appreciation of the excellent work which he has done for the society during his long term of office. Dr. W. P. Whitcombe, in making the presentation, referred to the devotion and labour which Mr. Haslam had given to the society and ascribed a large part of its success to his efforts.

*The Health of the City.*

The health committee reports that during the past half year the health of the city has been on the whole good and the records compare very favourably with those for the first two quarters in the preceding ten years. The birth-rate is rather lower than last year, 29·3 per 1000, as compared with 30 per 1000, and the death-rate was 17·9 per 1000, as compared with 16·9 during the same period of 1906, but had it not been for the severe and widespread attack of measles with which the city has been affected the death-rate would have been a record one for the first half of the year. There were more cases of typhoid fever than in the preceding year, but apparently they were due to the importation of contaminated shell-fish.

July 23rd.

## SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

*Changes in the Medical Curriculum in the University of Edinburgh.*

SOME time ago it was intimated in THE LANCET that an ordinance had been approved by the Senatus and the Court of the University of Edinburgh asking for alterations of an important nature in the medical curriculum. This ordinance, it was pointed out at the time, was opposed by some of the other Scottish Universities and was therefore likely to be blocked in its further course before the Privy Council and Parliament. The intimation which was received last week that the ordinance has been passed was a great and gratifying surprise. The new regulations will come into force in

October. The terms of the ordinance have been already given in THE LANCET, but their general tenour may be again outlined. The winter session is to be divided into two half-sessions, lasting respectively from October to Christmas and from January to March, and examinations are to be held at the end of the first half session as well as at the end of the second half and of the summer session as heretofore. Further, the examination in physiology may be taken at the end of the second winter and that in anatomy three months earlier than formerly. The subjects of the final examination may be taken separately. Thus, forensic medicine and public health may be taken at the end of the summer after the fourth winter, midwifery at the Christmas of the fifth winter, systematic medicine and surgery at the end of the fifth winter, and clinical medicine and surgery in the summer thereafter. The subjects of materia medica and pathology have changed places. The feeling that these changes were highly desirable is practically unanimous and it is felt that they will relieve students and examiners alike and will tend to raise the standard of work. It would be interesting to know what influences were at work to remove the opposition of Glasgow and Aberdeen to these alterations. It is the first step towards the autonomy which Edinburgh feels is so necessary if education is to be kept abreast of the rapid changes which are taking place in knowledge and in the methods of instruction. The University is to be congratulated warmly on the success of this forward movement.

*The Royal Society of Edinburgh.*

At a meeting of the Royal Society of Edinburgh held last week the Keith prize was awarded to Thomas H. Bryce, M.A., M.D. Edin., for his two papers on the Histology of the Blood of the Larva of Lepidosiren Paradoxa.

*Compliment to Sir A. R. Simpson, M.D. Edin., &c.*

It was intimated in THE LANCET some time ago that a fund was being raised to commemorate in some way the long services which Sir A. R. Simpson had rendered to medicine in Edinburgh. It was decided that the money should be applied to the endowment of a bed in the Royal Maternity and Simpson Memorial Hospital. On July 15th the sum was formally handed over to the board of directors.

*Medical Journalism in Scotland.*

It is understood that steps are being taken with a view to see whether it would not be possible to combine into one the medical journals published in Scotland. Whether the time is ripe for such an amalgamation remains, of course, to be seen and such an amalgamation has both advantages and disadvantages.

*The Glasgow Maternity Hospital.*

In issuing their seventy-second report the directors of this hospital have made a special appeal on behalf of the new building fund. An interesting survey is given of the history of the hospital. It was originally started in the grammar school wynd in 1834. In 1841 it was removed to a small house in St. Andrew's-square. Here for 19 years it did much to alleviate suffering among the poor and as a teaching school. In 1860 the hospital had outgrown its St. Andrew's-square premises and after careful consideration as regards the most suitable situation a house in Rotten-row was purchased and served for 20 years to carry on the work. In time, however, this house became too small for the demands made upon it, and in 1880 the directors built on the same site the present hospital. Now in turn this building is proving too small for the amount of work that has to be undertaken. A glance at the numbers of patients in the different years gives an idea of how the work has increased. In 1860 the number of women taking advantage of the hospital in its in-door and out-door departments was 944, in 1880 it was 1288, and in 1906 it was 3687. In order to meet the pressure on their present inadequate space the directors have acquired the properties on the three sides of Ure-place, and here it is intended to erect buildings with accommodation sufficient for the patients and at the same time suitable for the teaching of practical obstetrics and gynæcology. The sum which the directors require is £80,000. The price of the ground is £15,000, for the new buildings £15,000, and for furnishings, &c., £5000.

*University of Aberdeen: Appointment of Examiners.*

At a meeting of the Aberdeen University Court held recently the following appointments to examinerships were made:—Geology: Mr. A. Morley Davies, D.Sc., lecturer on Palæontology, Birkbeck College, London. Mathematics and Natural Philosophy: Sir W. D. Niven, K.C.B., M.A., LL.D., late Director of Studies, R.N. Medicine: Mr. Robert A. Fleming, M.A., M.D. Edin., lecturer on the practice of medicine in the School of Medicine of the Royal Colleges, Edinburgh. Midwifery: Mr. Alexander W. Russell, M.A., M.D. Aberd., assistant physician to the Glasgow Maternity Hospital. Zoology: Miss Marion J. Newbigin, D.Sc., lecturer on zoology in the Medical College for Women, Edinburgh. For the Diploma in Public Health: Mr. J. Taylor Grant, B.Sc., M.D. Edin., lecturer on medical bacteriology, Medical College for Women, Edinburgh.—The summer session at the University closed on Friday, July 12th.

*Aberdeen City Lunacy Board.*

The Aberdeen city district lunacy board has decided that the rate to be charged in the Kingseat Asylum for patients belonging to other parishes should be £35 per annum for the year ending May 15th, 1908. The asylum committee of the board reports the receipt of seven offers to cover the whole of the legal liability of the district board under the Workmen's Compensation Acts, 1897 and 1906, the Employers' Liability Act, 1880, and at common law, for the asylum officials and servants at a total premium of £21 5*s.*, subject to a discount of 15 per cent. for agent's fees; and there was also laid on the table an offer from the General Accident Insurance Company to cover the same risk at a net premium of £8 18*s.* 9*d.*, the whole of the offers being subject to wages adjustment at the end of the year. The committee unanimously recommends the acceptance of the offer by the General Accident Insurance Company.

*The late Mr. David Johnston, L.R.C.P. Edin.*

Intimation has been received in Aberdeen of the death, at 55, Kentish Town-road, London, of Mr. David Johnston, L.F.P.S. Glasg., who at one time carried on an extensive practice in Aberdeen. Mr. Johnston was a native of Glasgow. He acted for a time as a clerk in the office of the City of Glasgow Friendly Society and later was appointed agent to the Aberdeen branch. Two years after this Mr. Johnston commenced to study medicine. After qualifying he commenced practice in Aberdeen in 1870, and soon became very popular. In 1877 he disposed of his practice and became connected with the management of the Heathcot Hydropathic Institution. He afterwards resumed medical practice in Aberdeen and followed his profession for a number of years. He entered the town council in 1871 as a representative of the first ward and served for five years. Leaving Aberdeen about 25 years ago Mr. Johnston went to England and eventually found his way to London where he died at the age of 73 years. He was twice married and leaves two sons and one daughter. While attending a patient he fainted and two days later passed away. The deceased gentleman was a keen temperance reformer.

July 23rd.

## IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

*The Belfast Health Commission.*

ON July 16th Mr. Cutler, the city surveyor, was examined before the Commission. He said that the Act of 1899 bound the corporation to carry out a satisfactory purification of the sewage discharged into Belfast Lough within three years and that these three years had expired before he was appointed. In about three months he proposed to bring forward a scheme and he thought that within 12 months he could put in enough sprinkling beds to treat the normal outflow. Mr. J. C. Bretland, who was city surveyor from 1884 until 1903, said with regard to the size of the sewers in Belfast that he had followed the advice of a distinguished consulting engineer. Dr. E. A. Letts, professor of chemistry, Queen's College, Belfast, gave evidence in reference to experiments carried out by him regarding the discharge of sewage into the Lough. Mr. R. Meyer, chief clerk to the corporation, said that in 1900 the corporation applied for a loan of £78,000 for the purpose of enabling it to construct purification works, but the Local Government Board would only sanction £50,000, as it was of opinion that while the general lines on which it was proposed to treat the sewage before it was discharged were satisfactory it was desirable that a greater degree of

purification than had been obtained in the experimental works should be secured. Mr. R. Patterson, a Harbour Commissioner, said his experience of Belfast Lough, which he had known all his life, was that the whole of the banks opposite Holywood used to be covered by long crisp grass which was frequently washed, dried, and used for upholstering and packing purposes, being inoffensive. With the growth of Belfast and the gradual pollution of the lough with sewage this grass ceased to exist, its place being taken by the present foul-smelling ulva latissima. The latter was noticeable in 1870, in 1876 it became very objectionable, and it had gone on increasing steadily ever since. Mr. Redfern Kelly, engineer to the Harbour Commissioners, said there was a population by day of about 10,000 on the harbour estate. Of the two great shipyards the sewage from the one (Workman and Clark) was carted away and after having been dealt with was sold to farmers, while in the case of the other (Harland and Wolff) the sewage was discharged right into the tideway. The witness contended that the city corporation, being the health authority, was in a position to step in and to make the tenants of the Harbour Commissioners send their sewage out in the ordinary way. The blame, he said, was altogether with the health authority. In reply to the suggestion that if there was a nuisance on their property the Harbour Commissioners were the people to whom the health authority would naturally go in order to have it abated, Mr. Kelly said: How can we object to Harland and Wolff discharging into the tideway, seeing the corporation also discharges such immense quantities (sewage of about 370,000 people) into the tideway? Sir Otto Jaffe, in giving evidence, said that during the period typhoid fever had been prevalent in Belfast no single member of the Jewish community had been affected, and he attributed their immunity, among other reasons, to the fact that they abstained from eating shell-fish. Some further evidence having been given as to the laws regulating the use of shell-fish, Councillor James Gregg, M.R.C.V.S., gave evidence in regard to the milk-supply of the city and stated that the condition of the cowsheds and dairies, as a rule, was bad inside the city as regards the building of the cowsheds, their ventilation, the grooming of the cows, and the presence of tuberculous animals. He also thought that no pigs should be kept in the city. Mr. James Dempsey, a former member of the corporation, in his evidence advised the amalgamation of the corporation, water, harbour, and Poor-law boards, and that they should act by committees. It also came out as a result of his evidence that at the workhouse 14,000 corpses were buried in a space of three and a quarter acres. Miss Jane Agnew, sanitary sub-officer, gave evidence as regards the conditions under which outwork was carried on in the city, and said that 255 houses which she had visited required to be cleansed and repaired. Mr. H. McManus, a member of the executive committee of the Belfast Trades' Council, said that in his opinion there was insufficient inspection in sanitary matters in Belfast. He advocated the preparation and public exhibition of maps showing the localities in which infectious disease was present so that people could keep away from them, and thus those possessing property would take more care in improving the hygienic and sanitary condition of it. Dr. J. Barron, Mr. S. B. Coates, and Dr. H. R Torrens, dispensary medical men, were next examined as to the state of their districts. Mr. H. Norman Barnett gave evidence to show that in a number of cases investigated by the Society for the Prevention of Cruelty to Children the cause of the horrible filth of the houses and their necessarily insanitary condition was not poverty (the inmates having wages of from £1 to £2 weekly) but that the wages were spent on strong drink, and so the mother was unable and unwilling to keep her house fit for habitation. Mr. J. S. Oswald (chairman of the Belfast board of guardians) said that the workhouse graveyard was well sewered, and all burials were made under the Public Health Act. His experience satisfied him that at the Abbey Sanatorium for Consumptives splendid work was being done. Dr. John McLiesh (visiting medical officer of the union infirmary) said that a great many of the phthisical patients admitted into the workhouse hospital were labourers and mill operatives. Dr. A. Gardner Robb, physician to Purdysburn Fever Hospital, said that the present accommodation for infectious diseases was not sufficient. They had sufficient ground at Purdysburn Hospital to enable them so to extend it as to double the accommodation if necessary. Mr. C. J. Milligan, Dr. James Martin, and Dr. R. J. Munn, dispensary medical officers, were then examined as to the condition of their districts. Mr. James M'Kee gave evidence as to the cost of analysing food. He wanted recently to get three samples of milk analysed and was charged 5*s.* for each—that is, 15*s.* in all. He suggested that a nominal fee of 1*s.* should be the amount.

*Cerebro-spinal Fever.*

After an interval of two months since the last case of this disease was reported a young man, 16 years of age, resident at a place in the country midway between the towns of Lurgan and Portadown, was taken ill with this disease and on July 16th was removed to Lurgan Workhouse Infirmary, where he died on July 18th, the attack having been very severe. This is the fourth case in Lurgan Union which has proved fatal. During the week ended July 13th eight cases of cerebro-spinal meningitis were reported in Belfast, as compared with six in the previous week, and since the last meeting of the public health committee on July 11th up to July 18th only four cases had been notified. Although the large number of ten deaths occurred from the disease in the week ended July 13th it did not indicate any fresh increase in the epidemic. A most interesting point has been worked out at the pathological laboratory of Queen's College, Belfast, by Dr. Thomas Houston and Dr. J. C. Rankin. They have found that the cocci in the Glasgow, Edinburgh, New York, Philadelphia, and Hamburg epidemics are identical in their reactions, while, on the other hand, the cocci from the London cases do not react like those present in these epidemics. This raises the very important question as to the exact entity of the so-called posterior basic meningitis. Is it a sporadic form of the epidemic cerebro-spinal fever or is it a variety and not the same species of disease? Clinical experience in Belfast would support the view that posterior basic meningitis is not identical at all with the epidemic form and the work done in Queen's College laboratory is in the same direction. At a special meeting of the city corporation of Belfast, held on July 22nd, it was resolved that for a further period of six months, to date from July 1st, 1907, cerebro-spinal fever shall be a notifiable disease under the Infectious Diseases (Notification) Act of 1889.

July 24th.

## PARIS.

(FROM OUR OWN CORRESPONDENT.)

*Large Doses of Cryogenine in Tuberculous Fever.*

M. Crespin, assistant professor at the School of Medicine at Algiers, read a paper before the Therapeutical Society on June 25th upon the results which he had obtained by the use of cryogenine in over 200 cases of tuberculosis. The fever of pulmonary tuberculosis is easily affected by cryogenine, whether given at the commencement of the disease or at its end. The dose to be given varies according to the case, being sometimes more than 2·50 grammes in the 24 hours. Patients suffering from pulmonary tuberculosis seem to have a singular tolerance for the drug and the best time to give it is just before the temperature may be expected to rise.

*The Paris Faculty of Medicine.*

The council of professors of the Faculty of Medicine of Paris has recommended to the Government for the chair of anatomy in the first place M. Nicolas, professor of descriptive anatomy at the faculty of Nancy, and in the second place M. Rieffel. For the chair of the history of medicine and surgery it has recommended in the first place M. Gilbert Ballet and in the second place M. Dupré.

*Military Legislation for those Wounded on Active Service.*

At the Society of French Military Medicine M. Demmler on July 4th gave examples of affections contracted on active service, the sufferers from which were unable to obtain sufficient relief owing to the state of the law bearing on the subject. At the same meeting M. Billet and M. Schuttelaer brought forward various modifications for an alteration in the law. M. Piot and M. Salle recommended an improved organisation of the military thermal hospital stations and the methodical employment of all their therapeutic resources for the treatment of the consequences of wounds. This proceeding, they argued, would largely diminish the incapacity for work from which patients of this class suffer.

*Accumulators on Tramcars.*

M. Gautier has brought before the council of public

hygiene the state of things existing on tramcars furnished with accumulators; these accumulators give off penetrating acid vapours which cause the passengers to cough and to sneeze. At certain times matters become absolutely insupportable not only inside the car but also on the platform. Short-circuiting is stated to be the principal cause of the acid vapours being given off. The general secretary of the prefecture of police replied that he had decided to do away with this particular system of traction but that in the meantime the administration will endeavour to take steps to amend matters.

*The Liability of Medical Men.*

The public are more and more taking up the objectionable position of suing the medical man in charge of a case when any untoward event happens. A case was heard on July 13th of this nature. A young girl, Mdlle. Peyronette, who was suffering from appendicitis, was successfully treated for this disease by Dr. Cormon. Part of the treatment consisted in the application of ice, with the result that the skin of the abdomen was "frost-bitten" and the patient is still suffering from the wounds not being completely healed. Her family sued Dr. Cormon on the grounds that the wounds had been brought about by his carelessness. Dr. Balthazard, the expert whose duty it was to draw up the report and who is an *agrégé* in medicine, summed up the charges made against Dr. Cormon by saying that if he considered it necessary to use ice he should not have used it for such long periods of time together but should have interrupted the application from time to time. Also, said the expert, Dr. Cormon had neglected to put a piece of flannel or linen between the ice and the abdomen. However, he felt himself compelled to add that this latter precaution was not always taken in the hospitals and that though Dr. Cormon had erred he had not been guilty of malpraxis (*faute condemnable*). On his side Dr. Cormon brought forward a number of eminent expert witnesses. Dr. Jalaguier stated in evidence that no limit could be put to the time for which the ice should be applied; it should be kept on until the local phenomena for which it had been employed had disappeared. Dr. Jalaguier, who is surgeon to the hospitals, added that he had often made applications of ice for a much longer period than Dr. Cormon did and was convinced that by them he had saved his patients' lives; some surgeons recommended the use of flannel and others said it was of no use; the appearance of sloughs did not contra-indicate the continued application of the ice, for the rule was, "of two evils choose the least." Dr. Dieulafoy declared that sloughing (*escarre*) could not be foreseen—it might happen in spite of all precautions; the application of ice was an approved method of treatment, and the formation of a slough was a frequently inevitable consequence. Dr. Cormon's treatment had been perfectly proper. Several other eminent surgeons testified to the same effect—viz., Dr. Kirmisson, Dr. Rénon, Dr. Triboulet, and Dr. Routier. Judgment will not be given for a week and the result will be announced in due course.

July 20th.

## COPENHAGEN.

(FROM OUR OWN CORRESPONDENT.)

*The Professorship of Pathology in the University of Oxford.*

THE appointment of Dr. Georges Dreyer to the chair of general pathology in the University of Oxford deprives Denmark of one of its most prominent young men of science. In the comparatively short space of nine years, during which time he has been junior bacteriologist to the University of Copenhagen, he has been able to publish an important series of elaborate original investigations, chiefly on such subjects as agglutination, bacterial toxins, the action of rays of light, the sensitiveness of tissues to certain parts of the spectrum, the action and properties of radium, and the decomposition of enzymes. His devising of a very simple and sensitive method for the carrying out of the Widal test by means of dead cultures of the typhoid bacillus procured for him the post of director of the institute for the diagnosis of typhoid fever under the board of health of Copenhagen. He will be greatly missed both by his personal friends and by those at whose disposal he was always ready to place his extensive knowledge and wide reading. Professor Dreyer is well known in Oxford, having studied there in former years. In 1904 he was one of the speakers in the discussion on immunity that took place at the Oxford meeting of the British Medical Association.

*Death of Professor Edmund Hansen Grut.*

The Danish medical profession has sustained another heavy loss by the death of Professor Edmund Hansen Grut. The deceased, one of von Graefe's favourite pupils, was our first ophthalmologist in the modern sense of the word, and for many years he taught his specialty with exceptional success in the university at the outset as *privat-docent* and subsequently as professor of ophthalmology, after he had succeeded in overcoming the strong opposition in the faculty against the recognition of ophthalmology as a separate subject. Among the many scientific honours that fell to his lot, the one which perhaps he valued most was his being called in 1889 to deliver the Bowman lecture before the Ophthalmological Society of the United Kingdom.

*Country Holidays for Town Children.*

Among the many charitable institutions tending to improve the sanitary conditions of the poorer classes in Copenhagen none is, perhaps, more original and effective than the way in which an outing in the country is provided for a very large number of the pale and ill-fed children always to be found in a large town teeming with a manufacturing population. In many great cities charitable societies or wealthy individuals do a very considerable amount of good by sending parties of children out for a holiday in the country or at the seaside. Here also similar measures are taken, but naturally only a limited number can be cared for in this way and, what is, perhaps, most to be regretted, the children do not find a real home in their new residence. What makes it possible in Denmark during the summer months to confer the benefit of a home in the country on many thousands of poor Copenhagen children is the unique hospitality of just as many thousands of Danish farmers. For a number of years those good people have offered to take one child or more as their own into their families during the summer holiday without any recompense whatever. The offers are sent to the municipal school board of Copenhagen, and the teachers in the municipal free schools perform the delicate work of picking out those children whose state of health makes it most desirable for them to escape from the city during the heat of summer. The State authorities have recognised the importance of the movement by granting free passes over all the railway lines to any child who has got an invitation to a stay in the country. Some few days ago not less than 18,000 children were in this way sent out of town. Adding to these the poor children cared for by other means the total number may be estimated at 25,000, certainly a very considerable proportion of the indigent school children to be found in a city like Copenhagen, with a population of less than half a million.

*The Destruction of Rats.*

Our legislature has passed a new law directed against the rat nuisance. As the diseases the spreading of which is generally ascribed to rats, plague being a typical instance, never or hardly ever occur here it is only the destructive habits of the little rodents that have provoked the above-mentioned step. But in countries where the said diseases are more often observed it might perhaps prove useful to take similar measures. The State has decided to grant a sum of about £2000 a year for the distribution of rat-killing preparations and has, moreover, directed the municipalities throughout the country to pay about 1*d.* for every dead rat delivered to the proper officials. In order to prevent enterprising individuals from making money by wholesale breeding of rats heavy fines will have to be paid by those against whom it should be proved that they had either bred or imported rats for the purpose of selling them to the authorities.

*Medical Incomes in Sweden.*

A conspectus of the yearly income of Swedish public medical officers has been prepared by Dr. Andrew Alfvén. For 242 practitioners who had supplied the required information the average income derived from salary and practice was less than £400, varying from about £150 to about £900. The average cost of medical education was computed at £1000. The debt which their professional training has caused our colleagues to incur was on an average £750. The question at what age they had paid off, or thought they would be able to pay off, this debt was answered by 219 practitioners. Of these gentlemen 14 state that they see no way whatever out of the debt, 13 are doubtful, five name a very remote future, 20 had accidentally been freed from the debt,

99 had paid the debt (which in their case averaged less than £600) at the age of 41 years, and 69 (with a debt of £800) hope to be clear of it at the age of 51 years. Against this dark background the conspectus of the income of the Stockholm practitioners stands in a more pleasing light, for 50 per cent. of them have declared an income of more than £500, 12 per cent. an income between £400 and £500, and 28 per cent. an income below £400. It must be remembered that the cost of living is considerably less in Scandinavia and Denmark than in England.

July 22nd.

## ITALY.

(FROM OUR OWN CORRESPONDENT.)

*Medical Changes at the Vatican.*

IN Dr. Lapponi died the last of the "archiatri Pontifici." The economies effected by the reigning Pontiff in the administration of the Vatican have put an end to the office as well as to the name. There is now only a "medico privato di Sua Santità" (Dr. Petacci) with a "medico consulente" (Professor Marchiafava), neither holding a special position at the Pontifical Court, not even having the special uniform, so elegant and distinctive, which the "archiatri Pontifici" wore on state occasions. Other changes are not less notable. Dr. Lapponi, whom the present Pope's predecessor, Leo XIII., so highly esteemed, was nominated by that able and enlightened Pontiff director of the "servizi sanitari" of the apostolic palaces —an office of peculiar importance at the Vatican, as under Leo's reign there were frequently lodged within its area crowds of pilgrims of every nationality and clime, necessitating the most vigilant sanitary, hygienic, and medical supervision. In this capacity Dr. Lapponi displayed equal intelligence and skill, nowhere more than in the heating apparatus which was admirably effective. Leo XIII., indeed, took a personal interest in this as in all the duties of his "archiatro," down to examining the splendid microscope and the various cultures of micro-organisms which Dr. Lapponi used to submit to him from time to time. Pius X., however, has no such curiosity—caring only less for the wonders of bacteriology than for the novelties of practical hygiene, while contenting himself in the matter of heating with a simple brazier (*caldano*) placed in the anterooms leading to his private apartment. So long as Dr. Lapponi lived Pius made no further change to speak of, except indeed to suppress the lectureship on medical jurisprudence held by his "archiatro" with such acceptance. But now, as I have said, the old directorate of the "servizi sanitari" has been abolished with the title of "archiatro" itself—offices which entitled Dr. Lapponi to be present on state occasions and to be at hand, with control of the requisite *personnel*, should anything requiring medical aid occur at the audiences or receptions. An incident which saddened one of these functions not long ago was the sudden illness and death of a lady who was present—there being no one to give immediate aid except, by mere chance, a foreign physician who happened to be one of the audience. Such of the "servizi sanitari" as have been retained are under the care of two old medical attachés of the Vatican, Dr. Battistini and Dr. Masciarelli, who have no official connexion with the Court, who hardly ever know when or whom the Pope receives, and who have no such part in the disposal of the "servizi" as that formerly exercised by the "archiatro." Something like disorganisation of the "servizi" has been the consequence, the situation being practically this: Two medical men are available for the said "servizio" by day and two by night, either half of the 24 hours being thus provided for in case of medical assistance being required. A considerable number of supernumeraries, mostly medical aspirants, are, moreover, within call in case one or other of the two above-mentioned functionaries should have need of them. Every morning one of the two enters on his duties in the Vatican, visiting all the patients requiring attendance and remaining at his post for some time, in case of further eventualities. In the afternoon the visit is repeated but, as a rule, only *pro formâ*. The two relieve each other every 15 days and each receives 150 lire (£6) a month as a honorarium. Every evening one of the other two enters on his duties, in the winter months at 9 P.M., in the summer months at 10 P.M., and sleeps in the Vatican or in a dormitory close at hand, the said duties terminating at 7 A.M. The honorarium of each is 100 lire (£4) a month. The supernumeraries above referred to may be employed during the day or during the night and are paid at the rate of 60 lire (£2 8*s.* 4*d.*) a month. No medical post at the Vatican can be called lucrative—indeed, for some time past the subalterns have been taking steps to have an increase of pay or its equivalent; but their overtures have not as yet received much attention under the *régime* of economy that has set in. Still, the Cardinal Secretary of State has no difficulty in filling up vacancies—such is the ambition among many young physicians to serve the Holy See. At present the medical staff (leaving out the private physician of the Pope and his consultant) is composed of Dr. Battistini and Dr. Masciarelli for the daily "servizi," Dr. Amici and Dr. Cagiati for the night, and Dr. Gennari, Dr. Probi, Dr. Salvatori, Dr. Angeli, and others as supernumeraries. The corps of the "Guardie Nobili" has also its physician, Dr. Masciarelli; the Swiss Guard, Dr. Capparoni; and the "Guardia Palatina," Dr. Venturi and Dr. Calisti, all these being directly paid on a small scale by the corps to which they are attached, not by the Vatican itself.

*The Climatic Stations of Italy, Thermal and Maritime.*

May I draw your readers' attention to an official guide to the "Stazioni Climatiche Termali e Maritime d'Italia," issued by the Association for Promoting the Influx of Visitors? It is an excellent compendium of information likely to be useful to the British, Colonial, or American consultant, and is to be had gratuitously on application to the secretary of the association, Via delle Carrozze, Rome.

July 20th.

## VIENNA.

(FROM OUR OWN CORRESPONDENT.)

*The Toxic Effects of Tobacco, Tea, and Coffee.*

EXPERIMENTS conducted by Dr. Gross and Dr. Krämer in the Vienna physiological laboratory with a view of ascertaining the danger or otherwise connected with the use of some modern stimulants have brought out several interesting results. Both human beings and animals were examined and the number of the experiments was 250. It was found that the effects of tobacco are chiefly manifested in the circulatory and the alimentary systems. The action on the stomach is at first to stimulate secretion but this stage is of short duration, and a diminution of secretion then follows not only in the gastric mucosa but also in the salivary glands. The muscular coats of the intestines are irritated so that spasmodic contractions are brought about. Colic, painful spasms of a characteristic type and lasting from five to 17 minutes, and thin motions are recognised effects of excessive smoking. Leucoplakia of the tongue is mostly associated with syphilis and occurs almost exclusively in smokers; its relation to cancer is generally admitted. As regards the action of tobacco on the circulatory system, it was found that the blood pressure rises soon after smoking, the apex beat becomes more distinct, and the pulse increases. Chronic tobacco poisoning has an injurious influence on the arterial walls in consequence of the increased blood pressure; it promotes arterio-sclerotic changes, and the changes in the blood-supply of the nerves of the heart and the eye produce those lesions which are known under the name of tobacco poisoning and which many observers regard as nervous, whereas they are in reality organic lesions. Cigarettes are especially injurious, because the smoke of the paper is added to the action of the tobacco. Tea and coffee are relatively much weaker poisons, at least in the form of beverages, as they are generally used. A cup of weak tea or coffee acts favourably on the secretion of the stomach, so that coffee taken in moderation may be regarded as a stomachic, but excessive coffee drinking continued for a long time produces spasms of the involuntary muscles, tremor of the hands, palpitations, and atony of the stomach. It is difficult to draw a distinction between the effects of the above-mentioned substances, because in general at least two of them, if not all three, are habitually used. When total abstinence from them is not possible a very good plan for combating the ill-effects is found to be the observance of "free days," that is, of days when tobacco, coffee, and tea are either abjured by the patient or else used in very small quantity only. By allowing the organism to rid itself of the accumulated poison and so restoring the

original condition of the nervous centres the latter once more become capable of working normally. Patients suffering from disorders of the alimentary or circulatory system due to other causes than the above-mentioned ones have specially to be careful.

*The Ultra-microscope in Hæmatology.*

Dr. Neumann has communicated to the *Wiener Klinische Wochenschrift* the result of a series of interesting experiments which may prove to be useful in the diagnosis of diseases of the alimentary canal. Using the ultra-microscope, which has a magnifying power of 40,000 diameters, he examined both his own blood and that of other individuals, some of them being in good health and some of them suffering from various ailments. Among the red and white corpuscles he found a varying number of extremely small round granules which were constantly in molecular movement and have been called hæmokonia. During these investigations it was discovered that when fat, such as butter or lard, was added to the food these granules increased very greatly in number so that the whole of the visible field was covered by them. The increase began three-quarters of an hour after the ingestion of fat and reached its maximum about three-quarters to one hour later. For studying these phenomena it was best to use ordinary microscope slides about two millimetres thick. The best time for these experiments was the morning, when the stomach was empty. The patient was given a breakfast consisting of tea, white bread, and about one-third of an ounce of butter, or 13 ounces of milk without anything else. This was to be preferred because nearly all patients can take it. After three-quarters of an hour the first examination of the blood was made and subsequent examinations were made every half hour for four hours after the ingestion of the test meal. The patients on whom Dr. Neumann made his observations were 100 adults and 18 infants. He distinguishes five stages of the appearance of the minute granules. In the first stage there were no granules to be seen; the second he called "few"; the third he called "many," when the granules were to be seen in heaps between every few blood cells; then came "abundant"; and, finally, "enormous numbers." It was difficult to explain every stage but an observer soon became accustomed to the expressions. A remarkable and important difference was found in the preparations obtained from healthy and diseased persons. In all patients suffering from disorders of the stomach or other parts of the alimentary canal the "ultra corpuscles" were either absent or else they appeared at a much later stage than usual—namely, in from five to eight hours and in small quantity.

*Vital Statistics.*

The report of the Registrar-General for the second quarter of 1907 shows that the abnormal conditions prevailing since the last half year still influenced the general health of the population. The violent changes indicated by the varying barometric and thermometric readings could be followed in the figures for diseases of the upper respiratory tract, and the theory of the intimate connexion between low barometric readings and cerebral hæmorrhage receives some countenance from the figures of the report. No case of small-pox was notified during the quarter in question, whilst infectious diseases, such as measles, scarlet fever, and whooping-cough, were abundant both in the industrial centres and in the rural districts. The average mortality in Vienna for the last half year was 18·2 per 1000, showing a slight improvement as compared with the figures for the first quarter of the year due to the better returns of the second quarter. Epidemic cerebro-spinal meningitis has been notified in 45 cases. It must be added, however, that sporadic cases of this disease are found throughout the whole year in the city. The mortality was low, especially after using the pyocyanase of Dr. Jehle. Diphtheria was decidedly prevalent, every week bringing about 35 or 40 fresh cases; the mortality from this disease was below 5 per cent. in private practice and below 3·5 per cent. in hospital practice. As a rule the virulence of the Löffler bacteria was noted to be rather less than in former years. The weather was unfavourable for patients suffering from pulmonary tuberculosis and the deaths from this cause rose to 120 per week. Typhoid fever has lately assumed a more severe type. Perforation of the intestines seems to appear oftener, whilst hæmorrhage in the mucosa is also very often associated with it, so that Professor Schlesinger in a communication to the Vienna Gesellschaft der Aerzte did not scruple to speak of the "Vienna type" of typhoid fever. The births were about 1000 per week, with 86 stillbirths, and the mortality of infants under 12 months was 107 per 1000 births.

July 22nd.

# Obituary.

## JAMES DUNSMURE, M.D. EDIN., F.R.C.S. EDIN., LL.D.

THE intimation of the death of Dr. Dunsmure was a surprise and a shock to the profession in Edinburgh. He died on July 15th, from sudden heart failure, when to all appearance he seemed to have been progressing satisfactorily after a surgical operation. Dr. Dunsmure was the son of a well-known Edinburgh surgeon who was one of a number of interesting men who flourished in the middle Victorian time. The son, who is the subject of this notice, took the degree of M.B. at Edinburgh in 1867. After completing his education on the Continent he was associated with his father in practice. In 1870 he took the degree of M.D. and a year later was elected a Fellow of the Royal College of Surgeons of Edinburgh. He held a number of appointments as physician or surgeon to various institutions; but the most important post which he held was that of physician to the Royal Hospital for Sick Children. He was an ex-President of his College and it was during his occupancy of the Presidential chair that the University of Glasgow conferred upon him the honorary degree of LL.D. At the time of his death he was a member of the Council of his College and also an examiner for that College on the Triple Qualification Board. He was a member of the various Edinburgh medical societies. His personal qualities were very attractive and endeared him to a large circle of medical and lay friends. He was kindly, genial, and hospitable, with a high sense of honour and good business faculty. He was a keen sportsman: he fished, shot, and played golf and was no mean hand at any of them. He was fond of literature and an elder in St. Andrew's Church. He was, indeed, a man of cultured tastes who enjoyed life and made life pleasant to those around him. His wife died many years ago, about a year after their marriage, and the child of that marriage, a daughter, mourns the loss of a devoted parent. The funeral service was held in St. Andrew's Church and was attended by many of the leading members of the profession in Edinburgh. He was buried in the Dean Cemetery on July 19th.

DEATHS OF EMINENT FOREIGN MEDICAL MEN.—The deaths of the following eminent foreign medical men are announced:—Dr. Willem Koster, formerly professor of anatomy in the University of Utrecht.—Dr. Ferdinand Levison of Copenhagen, at the age of 63 years. He was the author of many important papers dealing chiefly with gouty and rheumatic conditions.

# Medical News.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At the quarterly examination in Practical Pharmacy just completed the following gentlemen were successful:—

Stanley Denovan Adam, St. Mary's Hospital; Charles Vernon Anderson and Sydney Vere Appleyard, St. Thomas's Hospital; Noel William Berry, St. George's Hospital; Herbert Stuart Blackmore, University College Hospital; Tobias Rustat Hemsted Blake, B.A. Cantab., Cambridge University and St. Bartholomew's Hospital; Owen Henry Bowen, St. Bartholomew's Hospital; Thomas Stratford Bradburn, Birmingham University; Gordon Normanby Brandon, St. Thomas's Hospital; Thomas Creswell Brentnall, Manchester University; Roger Orme Bridgman, St. Bartholomew's Hospital; Herbert Hayward Budd and John Head Burdett, St. Mary's Hospital; Howard James Barrell Cane, B.A. Cantab., Cambridge University and Guy's Hospital; William Edgar Carter, Leeds University; Henry James Clutterbuck, Middlesex Hospital; Francis Garland Collins, London Hospital; Robert Crawford, B.A. Cantab., and Alfred Edgar Cullen, B.A. Cantab., Cambridge University and St. Bartholomew's Hospital; Christopher Robson Dudgeon, Westminster Hospital; Percy Albert Stanley Dyson, Guy's Hospital; George James Frank Elphick, St. Mary's Hospital; Cecil Ledward Forde, B.A. Cantab., Cambridge and Liverpool Universities; Ashbury Joseph Stuart

Fuller, B.A. Cantab., Cambridge University and St. Bartholomew's Hospital; Herbert Gall, St. Bartholomew's Hospital; Harry Leon Gauntlett, King's College; Thomas Sidney Gibson, St. Bartholomew's Hospital; Bernard Goldsmith, Middlesex Hospital; Bernard Grainger Goodwin, Birmingham University; Samuel Richard Harrison, London Hospital; John Eric Hepper, St. Bartholomew's Hospital; Harold Howard Hiley, University College, Bristol; Gordon Alexander Hodgson, Leeds University; John Bowling Holmes, Manchester University; Thomas Robert Lloyd Jones, London Hospital; Latafat Hosein Khan, St. Bartholomew's Hospital; Sohan Lall, Lahore Medical College and London Hospital; Christian Frederic Louis Leipoldt, Guy's Hospital; Mark Lindsey, St. Bartholomew's Hospital; Thomas Parry Lloyd, Walter Everard Lloyd, and Donald Macrae, London Hospital; Horace Lloyd Mann and Edward Hillis Marshall, St. Thomas's Hospital; Godfrey Kindersley Maurice, St. Mary's Hospital; Malcolm Melton Melrose, Manchester University; James Knowles Milligan, St. Thomas's Hospital; Joseph Morrey, Manchester University; Malcolmson Knox Nelson, Guy's Hospital; Burford Noel Norman, University College Hospital; Max Nurick, Liverpool University; Wilfrid George Orchard, St. Bartholomew's Hospital; Henry Locke Paddon, B.A. Oxon., Oxford University and St. Thomas's Hospital; William Robert Parkinson and Adrian Charles Paterson, St. Thomas's Hospital; Percy Vivian Giles Pedrick, L.D.S. Eng., Guy's Hospital; Alfred Spearman Pern, St. Thomas's Hospital; Allan Pimm, University College Hospital; Vivian St. Leger Pinnock, University College, Bristol; D'Arcy Power, St. Bartholomew's Hospital; John Arnoux Prendergast, University of Leeds; Maurice Dyball Price, Guy's Hospital; James Stanley Robertson, London Hospital; Lawrence Lancaster Satow, St. Bartholomew's Hospital; Henry Lionel Hughes Steele, St. Thomas's Hospital; Alan Murray Stuart, St. Mary's Hospital; William Francis Sutcliffe and Wilfrid Percy Tindal-Atkinson, St. Thomas's Hospital; Harold John Austin Tootal, St. Mary's Hospital; Charles Grimshaw Waddington, Leeds University; George Fred Walker, Liverpool University; William Watts, Manchester University; Thomas Alexander Weston, B.A. Cantab., Cambridge University and St. Thomas's Hospital; and Arthur White and Herbert White, St. Thomas's Hospital.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated:—

*Surgery.*—M. L. Ford (Section II.), London Hospital; R. J. W. McKane (Sections I. and II.), Leeds; G. B. Messenger (Section II.), Westminster Hospital; O. C. H. L. Moll (Section II.), Guy's Hospital; and C. S. Ormsby, St. George's Hospital.

*Medicine.*—E. R. Bastard and F. H. W. Brewer (Section I.), St. Bartholomew's Hospital; J. Brierley (Section I.), St. Thomas's Hospital; M. L. Ford (Section II.), London Hospital; F. B. O'Dowd (Sections I. and II.), Birmingham; H. W. Phillips (Sections . and II.), Manchester; S. K. Poole (Section II.), Guy's Hospital; G. Rollason (Sections I. and II.), Birmingham; and J. S. Ward (Sections I. and II.), Sheffield.

*Forensic Medicine.*—E. R. Bastard and F. H. W. Brewer, St. Bartholomew's Hospital; J. Brierley, St. Thomas's Hospital; L. G. H. Furber, St. Bartholomew's Hospital; A. J. Hopper, Durham; F. B. O'Dowd, Birmingham; R. Rowlands, Glasgow; E. E. C. Vollet, Paris; and C. J. Wolfe, Edinburgh.

*Midwifery.*—A. R. Hardy, Manchester; M. Rathbone, Royal Free Hospital; G. H. Rodolf, London Hospital; and E. E. C. Vollet, Paris.

The diploma of the Society was granted to the following candidates, entitling them to practise medicine, surgery, and midwifery: E. R. Bastard, M. L. Ford, A. J. Hopper, R. J. W. McKane, G. B. Messenger, E. E. C. Vollet, and J. S. Ward.

UNIVERSITY OF LONDON.—At examinations held recently the following candidates satisfied the examiners:—

M.D. EXAMINATION.

*Medicine.*—Harold Edward Dyson, B.S., University College; Harry Finzel, B.S., St. Bartholomew's Hospital; Montague Leonard Hine, B.S., Middlesex Hospital; Thomas Lewis, B.S., University College; Reginald Henry Miller, B.S., St. Mary's Hospital; Robert Milne, B.S., London Hospital; Leonard Gregory Parsons, B.S., University of Birmingham; John Robert Steinhaeuser,* B.S., Guy's Hospital; Frederick George Thomson (University medal), University of Cambridge and Middlesex Hospital; and Ralph Osmund Williams, B.S., Guy's Hospital.

*Pathology.*—Thomas Swale Vincent, University of Birmingham, University College, and University of Edinburgh.

*Mental Diseases and Psychology.*—Philip Anthony Mark Green, London Hospital.

*Midwifery and Diseases of Women.*—Vincent Z. Cope, B.A., B.S., St. Mary's Hospital; Charles Dyson Holdsworth, B.S., University College; Bardley L Hollaud, B.S. (University medal), King's College; Helen Nora Payne, B.S., London (Royal Free Hospital) School of Medicine for Women; and Frank Thomas H. Wood, B.S., B.Sc., Guy's Hospital.

*State Medicine.*—Alfred Henry Gerrard, M.D., University College.

*Tropical Medicine.*—Ernest Edgar Maples, B.S., St. Bartholomew's Hospital and London School of Tropical Medicine.

* Obtained the number of marks qualifying for the University medal.

M.S. EXAMINATION.

Sidney Arthur Boyd, Charing Cross Hospital; Harold Collinson University of Leeds; Philip Maynard Heath (University medal) and Harold Turley Mant, University College; and Thomas Perrin, M.D., London and St. Thomas's Hospitals.

N.B.—This list, published for the convenience of candidates, is issued subject to its approval by the Senate.

FOREIGN UNIVERSITY INTELLIGENCE.—*Berlin:* Dr. Paul Lazarus, Dr. Max Mosse, Dr. Leonor Michaelis, Dr. Ludwig Blumreich, and Dr. Josef Heilbron have been granted the title of Professor. Dr. Anton Steyrer, Dr. Jürgans, and Dr. Leo Mohr have been recognised as *privat-docenten* of Medicine.—*Bologna:* Dr. Gaetano Finizio of Naples has been recognised as *privat-docent* of Children's Diseases.—*Bonn:* Dr. A. Hübner and Dr. Gustav Embden have been recognised as *privat-docenten* of Internal Medicine and Dr. E. Zurhelle as *privat-docent* of Midwifery and Gynæcology.—*Breslau:* Dr. Hermann Küttner of Marburg has been appointed to the Chair of Clinical Surgery in succession to Dr. Garré. Dr. A. Neisser, Extraordinary Professor of Dermatology and Syphilis, has been promoted to an Ordinary Professorship. Dr. Hannes has been recognised as *privat-docent* of Midwifery and Gynæcology.—*Brussels:* Dr. Heger is resigning the Chair of Physiology but retains his position as Director of the Solvay Institute.—*Budapest:* Dr. Johann Bokay, Extraordinary Professor of Children's Diseases, and Dr. Alexander Koranyi, Extraordinary Professor of Medicine, have been promoted to Ordinary Professorships.—*Copenhagen:* Dr. O. C. V. E. Petersen has been recognised as *privat-docent* of Anatomy.—*Cracow:* Dr. Roman Nitsch has been recognised as *privat-docent* of Hygiene.—*Innsbruck:* Dr. Alois Lode, Extraordinary Professor of Hygiene, has been promoted to an ordinary professorship.—*Kharkoff:* Dr. K. Elenevski has been recognised as *privat docent* of Pathological Anatomy and Dr. Jakushevich as *privat-docent* of Medicine.—*Kiel:* Dr. Hermann Pfannenstiel of Giessen has been appointed Ordinary Professor of Midwifery and Gynæcology, in succession to Dr. M. R. Werth who retires.—*Königsberg:* Dr. Draudt has been recognised as *privat-docent* of Surgery and Dr. Hofbauer as *privat-docent* of Gynæcology.—*Lund:* Dr. Overton, Assistant in the Physiological Institute, Wurzburg, has been appointed Extraordinary Professor of Pharmacology.—*Marburg:* Dr. Paul Leopold Friedrich, Professor of Surgery in Greifswald, has been offered the chair of Surgery in succession to Dr. Küttner who goes to Breslau.—*Munich:* Dr. Albert Döderlein of Tübingen has been appointed Professor of Midwifery and Gynæcology in succession to Dr. Winckel, who retires. Dr. Wilhelm Lohmann has been recognised as *privat-docent* of Ophthalmology.—*New York (College of Physicians and Surgeons):* Dr. P. F. Chambers has been appointed Professor of Gynæcology.—*Prague (Bohemian University):* Dr. Ollokar Kutoirt has been recognised as *privat-docent* of Laryngology and Otology, and Dr. Anton Ostroil as *privat docent* of Midfery and Gynæcology.—*Odessa:* Dr. I. Kiyanitzyn of Kharkoff has been appointed to the chair of Hygiene.—*Prague (German University):* Dr. R. Kretz of Vienna has been appointed Professor of Pathological Anatomy in succession to Dr. Chiari. Dr. Adolf Schenkel, Extraordinary Professor of Ophthalmology, has been granted the title of Professor.—*Rostock:* Dr. Riemer has been recognised as *privat docent* of Hygiene, and Dr. Reinmöller as *privat-docent* of Dental and Oral Diseases.—*Tübingen:* Dr. Menge of Erlangen has been offered the chair of Midwifery and Gynæcology in succession to Dr. Döderlein. Dr. C. Schlayen has been recognised as *privat-docent* of Internal Medicine.—*Vienna:* Dr. Rosthorn of Heidelberg has been appointed to the chair of Midwifery and Gynæcology recently held by Professor Rudolf Chrobak. Dr. Wilhelm Falta has been recognised as *privat-docent* of Medicine; Dr. Heinrich Neumann as *privat-docent* of Otology; and Dr. Paul Clairmont and Dr. Paul Albrecht as *privat-docenten* of Surgery.

THE CHARGES OF THE PUBLIC VACCINATOR.—Public vaccinators' charges have always caused some grumbling on the part of the guardians of the Wandsworth Union. They were among the first to reduce the fee from 5*s.* to 2*s.* 6*d.* A deputation of practitioners attended the meeting of the board on July 18th and Mr. E. R. Badcock, the spokesman, pointed out that each vaccination entailed considerable expense to the medical man who had to make an average of four visits to secure one fee. They left it to the board to deal justly. Mr. Badcock mentioned that the minimum fee was certainly not lucrative. It was not the intention of the Local Government Board that fees should be reduced without regard to circumstances. A lady guardian asked whether the medical men did not receive a capitation fee of 1*s.* for each child on the vaccination officers' lists. Mr. Badcock replied that that was so but pointed out that in each case a communication had to be written and an appointment made to attend. Another member of the board asked whether a well-known local medical man had not stated that he considered 2*s.* 6*d.* a very good price, and whether many persons were not privately vaccinated for that charge. He was

informed by Mr. Badcock that private vaccinations at a surgery did not necessitate either correspondence or visits. Although a few members of the board who are opposed to vaccination were opposed to increasing the minimum (which they consider ought not to exceed 1s.) the deputation made a favourable impression on the board. It was admitted that members had previously had no idea that a public vaccinator had to do so much for his fee. One of the ladies remarked that she believed in everybody being fairly paid and therefore she proposed a return to the 5s. minimum. A gentleman suggested 3s. 6d.; this would probably have been agreed to had not another member discovered that proposals were out of order since the medical men had not refused to accept the fee of 2s. 6d. The question was therefore adjourned.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—A quarterly meeting of this College was held on July 16th, Dr. C. E. Underhill, the President, being in the chair. The President made feeling reference to the loss which the College had sustained by the death of Sir William Tennant Gairdner. On a ballot the following candidates were admitted to the Membership of the College: James Ritchie, M.D. Edin., Edinburgh; David Halliday Croom, M.D. Edin., Edinburgh; and Leonard Horner Bryson, M.B., C.M. Edin., St. Andrews. The registrar reported that since the last quarterly meeting of the College 18 persons had obtained the licence of the College by examination. Dr. G. Lovell Gulland, F.R.C.P. Edin., was recognised as a lecturer on medicine. The regulations regarding the single licence and Membership and Fellowship of the College for the ensuing year were approved.—By vote of the College James William Ayres, a Licentiate of the College, was expelled from the College and deprived of his licence to practise, as granted by the College, and of all his rights and privileges as Licentiate.

THE LONDON HOSPITAL MEDICAL COLLEGE (UNIVERSITY OF LONDON).—On July 17th Mr. Hudson E. Kearley (Parliamentary Secretary to the Board of Trade) distributed the prizes and certificates to the successful candidates in the library of the Medical College. Mr. Douro Hoare (chairman of the College board) presided, and the Hon. Sydney Holland (chairman of the hospital), the members of the house committee and staff, and a large gathering of visitors were present. Unfortunately Mr. Munro Scott (the warden of the College) was unable to be present as he was only just recovering from an operation; needless to say he was greatly missed by all. Mr. Douro Hoare, in asking Mr. Kearley to distribute the prizes, alluded to the prosperity of the College and thanked Mr. Kearley for his munificent gift to the pathological institute which had enabled the College to develop the branch of its work which promised good results in the future. Mr. Kearley, in addressing the meeting, stated that he had been much impressed by the efficiency of the organisation of the hospital and the good spirit in which it was carried on; while the Hon. Sydney Holland, in his speech, complimented the nursing staff on its efficiency and the hospital upon its nearness to completion The following prizes were then distributed:—Price scholarship in science: £120, Mr. H. B. Walker. Price scholarship in anatomy and physiology: £60, Mr. E. J. Fearnsides. Entrance science scholarships: £60, Mr. F. Sanders; £35 Mr. R. A. Rowlands. Buxton scholarship in arts: £30, Mr. J. W. Clouston; £20, Mr. L. M. Ladell. Epsom scholarship for students of Epsom College: Mr. R. K. Mallam. Medical scholarship: £20, Mr. R. B. Lloyd; honorary certificate: Mr. A. R. Jordan. Surgical scholarship: £20, Mr. P. H. Bahr; honorary certificate: Mr. A. R. Jordan. Obstetric scholarship: £20, Mr. G. Ley; honorary certificates: Mr. G. H. Davy and Mr. D. Loughlin. Duckworth Nelson prize: £10, Mr. R. B. Lloyd; honorary certificate: Mr. A. R. Jordan. Senior Letheby prizes: £10 each, Mr. R. A. Rowlands and Mr. J. A. Tsoi-A-Sue (equal) and Mr. F. Sanders; honorary certificates: Mr. W. S. Wildman, Mr. C. C. Beatty, Mr. G. F. Bradley, and Mr. H. B. Walker. Junior Letheby prize: £10, Mr. J. R. C. Stephens; honorary certificate: Mr. E. H. Heaton. Anatomy and physiology scholarship: £25, Mr. E. B. Morley; honorary certificates: Mr. G. Taylor, Mr. R. H. Candy, and Mr. H. Neame. Anatomy and biology scholarship: £20, Mr. H. B. Walker; honorary certificate: Mr. R. A. Rowlands. Minor surgery prizes: £12 10s. each, Mr. T. C. Reeves and Mr. E. C. Lindsay; £10 each, Mr. E. H. Rainey and Mr. Stanley Boyd; £5 Mr. H. Neame. Practical anatomy prizes: £6, Mr. E. H. Rainey; £4, Mr. J. G. Mosely and Mr. B. Bernstein (equal). Anderson prizes: Mr. C. W. Huyssen, Mr. H. G. Frean, Mr. W. H. Cam, Mr. S. Gordon, Mr. D. Davies, and Mr. R. D. Brownson; honorary certificates, Mr. E. J. Fearnsides, Mr. Stanley Boyd, and Mr. S. H. Scott. Douro Hoare prize: £5, Mr. E. H. Rainey; honorary certificate, Mr. G. Taylor. Wynne Baxter prize: £5 5s., Mr. C. R. Harvey. Probationers' prizes: First, Miss Janet Scott; second, Miss Susan Mary Somerset; and third, Miss Maude Lizzie Shipman. The prizes and certificates having been distributed, Mr. C. W. Mansell Moullin (senior surgeon to the hospital) proposed a vote of thanks to Mr. Kearley, which was seconded by Dr. Francis Warner (senior physician to the hospital), and carried with much cordiality. After the distribution of the prizes the visitors spent the remainder of the afternoon in the garden of the hospital, where, amongst other attractions, were Dr. Leonard E. Hill's exhibitions of his diving gear and a life-saving apparatus for use in mines, and in the students' club room a new epidiascopic lantern, all of which proved to be very interesting to everyone.

THE VICTORIA UNIVERSITY OF MANCHESTER.—Dr. Graham Steell, who has been appointed by the Council professor of medicine in the University, has had a long and intimate connexion with the Royal Infirmary of Manchester, having acted successively as resident medical officer and physician in that institution, of which he is at present the senior physician. For many years he has been a lecturer, first in the Owens College and subsequently in the University where he has held the posts of lecturer on clinical medicine and also of lecturer on diseases of the heart.—At a meeting of the friends of the late Professor J. Dreschfeld held recently it was agreed to make arrangements for securing some permanent memorial of him in Manchester.—The following appointments have been made: Junior Demonstrator in Anatomy, Mr. A. E. Quine, M.B., Ch.B. Vict.; Demonstrators in Anatomy for the Winter Session, Mr. S. H. J. Kilroe, M.B. Lond., and Mr. T. W. Todd; and Junior Demonstrator in Physiology, Mr. Philip Ferguson, M.B., Ch.B. Vict.—The dental department forms an integral part of the faculty of medicine. Instruction adapted to the requirements of students preparing for the B.D.S. degree and the dental diplomas of the University, the Royal College of Surgeons of England, and other licensing bodies is given during the winter and summer sessions both at the University and at the Victoria Dental Hospital, and the latter is well provided with the appliances necessary for carrying on the work in a thoroughly efficient manner. Two dental surgeons are in attendance when the hospital is open, and are always ready to advise and to direct the students and the demonstrators and house surgeons are constantly present to overlook the work and to render every necessary assistance. Communications concerning classes, fees, conditions of entry, attendance of students, &c., should be addressed to the Dean of the Medical Faculty, the University, Manchester. The Dean of the Dental Hospital may be addressed at the hospital, Devonshire-street, All Saints, where he may be seen on Friday mornings from 9 to 11.30, or at other times by appointment.

THE MAITLAND COTTAGE SANATORIUM: AN INTERESTING SCHEME.—A meeting was held at Kingwood, Peppard's Common, on July 20th which had for its object the promotion of a scheme for the development of the adjoining Maitland Cottage Sanatorium, but the subjects discussed were of more than local interest. The Maitland Cottage Sanatorium has been in existence for some six years under the direction of Dr. Esther L. Carling for the benefit of the poor suffering from tuberculosis in its early stages. Fortified by the experience so gained it is proposed to enlarge the sanatorium, but it is also proposed to append a labour colony and a kindergarten school to the institution. The meeting was presided over by the Hon. F. W. D. Smith, M.P., and speeches in support of the scheme were made by Professor W. Osler, Dr. S. Davies (medical officer of health of Woolwich), and others. Professor Osler expressed a very strong opinion that tuberculosis should be added to the list of notifiable diseases. After quoting the Registrar-General's statistics of mortality from tuberculosis he divided those suffering from the disease roughly into two classes: (1) the advanced cases for which special isolation should be provided; and (2) cases in the early stages of the disease which must be dealt with in sanatoriums similar to the Maitland Cottage Sanatorium. He further dwelt on the educative value of such establishments as spreading among the poor a much needed knowledge of hygiene. Dr. Davies then spoke to the practical

results already obtained in the sanatorium. The Woolwich municipality, he said, had sent patients since 1903 to Maitland Cottage, seven beds being now supported by Woolwich. The cases had been sent on his selection, and on their discharge he had observed them after their return to work. Out of 42 patients half, he said, were now at work. There had been ten deaths, and of the balance some had relapsed, some had emigrated, and some had been lost sight of. In his opinion the results of such sanatorium treatment would be even more satisfactory could the patients be hardened by a graduated system of work in a labour colony. A sudden return to ordinary conditions of life and labour was often followed by a relapse, whereas he had noticed that those cases in which it had been possible to continue treatment for over six months had apparently been cured or were continuing to improve. The sum appealed for by Dr. Carling is £10,000, to be applied as follows: £4000 to be invested as an endowment fund; £2000 to acquire a farm adjoining Maitland Cottage for the purposes of the labour colony; and £4000 for necessary extension of buildings and equipment. So far a charge of 30*s.* per week per patient has just covered working expenses. It is estimated that a charge of 15*s.* per week will be sufficient to maintain without loss to the institution those kept on as workers, owing to their labour making them partially self-supporting. This is taking into consideration that the initial expenses are met by the public. The extension proposed will provide accommodation for 50 adult patients and 10 children, for whose benefit it is hoped that a sanatorium kindergarten may be started. It will be seen that an experiment of considerable social interest is here projected and one which it seems to us the public may well be invited to support. It should be added that the site, being on a spur of the Chilterns in beautiful common land, is an admirable one for the proposed extension.

THE SECOND INTERNATIONAL CONGRESS OF PHYSIO-THERAPY.—The English secretary, Mr. W. Deane Butcher, Holyrood, Ealing, London, W., asks us to remind our readers that this congress will be held at Rome from Oct. 13th to 16th and that the Italian Minister of Public Works has granted special travelling facilities on all lines both on the mainland and on the islands. Books of coupons will be issued to each member or associate of the congress by the organising committee. The coupons, which will be valid from Oct. 1st to Nov. 15th, will enable the holders to travel at a reduction of from 40 to 60 per cent. on ordinary fares.

A SHORT vacation course of 24 demonstrations and lectures will commence at the Post-Graduate College, West London Hospital, on Monday, August 12th next. Practitioners wishing to join this course or desiring further information about the Post-Graduate College should apply to Mr. L. A. Bidwell, the dean, at the hospital.

AN ASSOCIATION OF POOR-LAW INFIRMARY MATRONS.—A meeting was held at the Chelsea Infirmary on July 22nd to consider the advisability of forming an association of Poor-law infirmary matrons. It was agreed unanimously that such an association was urgently required. A constitution was drawn up and it was decided to hold quarterly meetings for the discussion of questions of interest.

ENNOBLEMENT OF A BAVARIAN PHYSICIAN.—Professor Friedrich Müller of Munich, who was invited to accept the vacant chair of medicine in Berlin, but preferred to remain where he was, has received the order of the Bavarian Crown, which implies a patent of nobility.

# Parliamentary Intelligence.

## NOTES ON CURRENT TOPICS.

*Glasgow Medical Men and the Notification of Births.*

IN the Glasgow Corporation Bill, which came before the Police and Sanitary Committee of the House of Commons on July 17th, there was a clause making provision for the notification of births within 48 hours of their occurrence.—Dr. A. K. CHALMERS, the medical officer of health of Glasgow, Dr. MARY T. GALLAGHER, and other witnesses gave evidence to the committee in strong support of the clause.—Mr. HAROLD BEVERIDGE, one of the counsel for the Glasgow corporation, explained to the committee that the medical faculty had held a meeting in Glasgow and had intimated that they wished to be relieved of the duty of notification.—After some discussion the chairman of the committee, Mr. CORRIE GRANT, intimated that the clause must be put in agreement with the Huddersfield clause which imposed the duty of notification upon the medical man in attendance at the time of the birth and also provided for the payment of 1*s.* for each notification.—Mr. BEVERIDGE, after consultation with the members of the corporation of Glasgow, intimated that if the committee insisted on the inclusion of the provision regarding the payment of 1*s.* the promoters would prefer to drop the clause and to wait for the passing of the public Bill which was now before Parliament.—The clause relating to the notification of births was then deleted from the Bill.

*A Scottish Vaccination Bill.*

Lord HAMILTON of DALZELL has introduced a Scottish Vaccination Bill into the House of Lords. It has been read a first time. Its object is "to amend the law with respect to vaccination in Scotland by authorising a statutory declaration of conscientious objection."—Lord BALFOUR of BURLEIGH has given notice that he intends to move the rejection of the Vaccination (Scotland) Bill when it comes up for second reading.

*Public Health Acts (Scotland) Amendment Bill.*

The Public Health Acts (Scotland) Amendment Bill, which Lord HAMILTON of DALZELL introduced in the House of Lords on Monday, it is understood, relates to the notification of tuberculosis. Local authorities have felt themselves hampered by the existing law and the Bill, it is believed, proposes certain relaxations in reference to such matters as certificates for children attending school and the carriage of infected persons in public conveyances.

*The Dairies, Cowsheds, and Milkshops Order.*

The return which was ordered on the motion of Dr. RUTHERFORD showing the names of the councils of boroughs and urban and rural districts which made regulations under the Dairies, Cowsheds, and Milkshops Order of 1885, and also the number of councils of each class which have not any such regulations, has now been published as a Parliamentary paper.

*The Notification of Births Bill.*

The course of the Notification of Births Bill, which was introduced into the House of Commons by Lord ROBERT CECIL, is not likely to be so smooth as was hoped by its promoters. It has passed through a Standing Committee of the House, but two pages of amendments have been put down by various members for consideration when the report stage is taken.—Sir HENRY KIMBER has given notice that he will move the re-committal of the measure "for the purpose of amending it in several respects, particularly by striking out the provision that medical practitioners and midwives should be compelled to furnish the notification in question."

## HOUSE OF COMMONS.

WEDNESDAY, JULY 17TH.

*Fees under the Vaccination Bill.*

Mr. DUNDAS WHITE asked the President of the Local Government Board whether, in view of the fact that under the present law the fees which conscientious objectors to vaccination had to pay for exemption certificates were public moneys, he would say why it was proposed that part of the fees for making the statutory declaration which it was proposed to substitute for these certificates should go to commissioners for oaths and other private persons.—Mr. JOHN BURNS replied: Justices' clerks are remunerated by salary and any fees received by them have to be paid over to the fund from which the salary is defrayed. Commissioners for oaths do not receive any salary and consequently they retain the fees paid to them.

*A Chester Vaccination Order.*

Mr. MOND asked the Secretary of State for the Home Department whether his attention had been called to the fact that in the Chester city police court on Wednesday, July 3rd, 1907, upon the hearing of an information under the Vaccination Acts against Thomas Boden, a threat was made both by the magistrate's chief clerk and the chief constable, that in consequence thereof his licence as a lodging-house keeper might be taken from him; and whether he would take the necessary steps to prevent any such course, seeing that no provision for it was authorised by any Act of Parliament, and the prescribed penalties under the Vaccination Acts were imposed upon the defaulter.—Mr. GLADSTONE answered: It appears that on the 3rd inst. an order was made for a child of Thomas Boden to be vaccinated within 28 days and no further proceedings had been taken. The clerk to the justices remarked that as Boden kept a common lodging-house possibly the corporation committee might consider the question of refusing the licence if a child was not vaccinated, and the chief constable acquiesced in this remark. No threat was made and the clerk has no control over the committee who deals with the licensing of lodging-houses. I cannot take any action in this matter.

THURSDAY, JULY 18TH.

*Fatal Accidents in the United Kingdom.*

Mr. LAIDLAW asked the Secretary of State for the Home Department how many fatal accidents were reported as having occurred in the United Kingdom in the years 1904, 1905, and 1906 respectively.—Mr. GLADSTONE (by printed answer) replied: The number of deaths in England and Wales due to accident or negligence was 10,902 in 1904 and 10,829 in 1905. The figures for 1906 are not yet available. The number in Ireland was 1675 in 1904 and 1588 in 1905; the number in Scotland in 1904 (the last year for which figures can be given) was 2594.

*A Vaccination Case at Croydon.*

Mr. LUPTON asked the President of the Local Government Board

whether his attention had been called to the case of a boy who died in Croydon on April 29th last as the result of vaccination; whether he was aware that the case was investigated by Dr. S. M. Copeman of the Local Government Board; that the child had sores on the head, face, and arms, and lingered in agony for three months; whether he would say if he was still supplying public vaccinators with the same class of lymph; and whether he would lay Dr. Copeman's report upon the table.—Mr. JOHN BURNS answered: I am aware of the case referred to, although I did not know that the child lingered in agony for three months, nor had I been informed of his death. The case was investigated by Dr. Copeman and several medical men. 20 other cases were vaccinated with the same lymph as this child and, so far as was ascertained, the case in question was the only one in which the child subsequently had sores. These sores appear to have been, in fact, "the bromide rash" and to have been due not to vaccination but to doses of bromide of potassium administered by the mother on account of the fits from which the child suffered. It is estimated that 178 grains of the drug were given to him. Dr. Copeman's report is a confidential document and I could not undertake to lay it on the table of the House.

*Medical Officers and the Factory Act.*

Mr. RAMSAY MACDONALD asked the Secretary of State for the Home Department whether his attention had been drawn to Table 8 in the report of the Chief Inspector of Factories for 1906, wherein it was shown that the number of names of outworkers received was greatly in excess of the number of visits made by the medical officers of health in Sheffield, Belfast, Worcester, Ipswich, Gloucestershire, West Ham, Westminster, and other areas; and what steps he proposed to take to make this inspection efficient.—Mr. GLADSTONE said in answer: Yes, sir, this table was included in the chief inspector's report by my directions with a view to the improvement of the present conditions. The steps that have been taken by me to improve the administration of the home work provisions of the Factory Act by the local authorities have been to issue a circular on the subject to the authorities and the medical officers of health, calling their attention to the importance of a thorough administration of the Act and, secondly, to propose that the matter shall be discussed at a conference with medical officers of health which it is intended to hold at the Home Office in the autumn.

Mr. RAMSAY MACDONALD then asked the right honourable gentleman whether his attention had been drawn to the fact, as shown in the annual report of the Chief Inspector of Factories for 1906, that 634 medical officers of health still neglected to perform the statutory duties imposed on them by the Factory and Workshop Act to report to the Home Office regarding their administration of that Act; and how long the Home Office proposed to allow this neglect to continue.—Mr. GLADSTONE replied: The great majority of the medical officers who have failed to send in reports—namely, 477 out of 634—are in Ireland. Under the Irish Public Health law the medical officers other than the few superintending medical officers are not required to make any report to the local authority and I am advised that it is doubtful how far in consequence any obligation is placed upon them by Section 132 of the Factory Act. As I have already stated, a special circular was sent out last year by the Home Office calling the attention of the local authorities and medical officers to their duties in regard to home work, and I propose to communicate specially this autumn with those local authorities from which no reports were received in 1906. I may add that in many districts from which no report is sent the Factory Act has little or no application, and the omission is comparatively unimportant.

Mr. RAMSAY MACDONALD put a further question to the Home Secretary as to whether his attention had been drawn to the figures in the annual report of the Chief Inspector of Factories, showing that in 1905 in the borough of Stepney the medical officer reported only 32 inspections of outworkers out of 8998 persons notified to be such in the two half-yearly returns, and that the same medical officer reported no inspection in 1904; and why, in view of these facts, he had not authorised an independent inspection at the expense of this borough under Section 4 of the Factory and Workshop Act, 1901.—Mr. GLADSTONE answered: I am aware of the figures referred to and I am communicating with the borough council on the subject. I am advised that it is doubtful whether the powers under Section 4 of the Factory Act cover a case such as this. But in any event for the Factory Department to assume in this and similar cases the duties in respect of home work which the Act imposes on local authorities would be to add greatly to the work of a department already more than fully employed. The whole question of home work is now under the consideration of a Select Committee of this House, and pending its report I cannot see my way to make the considerable change in the administration of these provisions which is suggested by the honourable gentleman.

Mr. RAMSAY MACDONALD, in the last of his series of questions to the Home Secretary, asked whether his attention had been drawn to the fact, as shown in Table 8 of the annual report of the Chief Inspector of Factories for 1906, that in 2194 cases, on the showing of medical officers of health, employers were discovered to have sent in to the district council no list of outworkers as provided by Section 107 of the Act, and that of these no fewer than 753 remained unremedied, a substantial increase being thus shown in the neglect in this respect over last year; whether his attention had also been drawn to the increased number of defects remaining unremedied as regards work being given out to be done in unwholesome premises, and allowing wearing apparel to be made in premises infected by scarlet fever or small-pox; and whether he could inform the House what steps the Home Office was taking to reduce the number of these cases of negligence on the part of so many medical officers of health.—Mr. GLADSTONE replied: I am aware of the figures to which the honourable Member calls attention. Taking the figures which relate to the outworkers' lists altogether, the returns for 1905 seem to me to point to an appreciable increase of activity on the part of local authorities with regard to the collection of these lists. 2500 more lists were received and 18,000 more names of outworkers and the fact that nearly 700 more failures were discovered than during the previous year shows, I think, that the officers of the local authority are following up these cases more carefully than before and perhaps also compiling the returns for the Home Office more carefully. I may call the attention of the honourable Member to the fact that the number of prosecutions taken by the local authorities for failure to send in lists is more than double that of 1904. As regards action under Sections 108 to 110 I do not think that any trustworthy inference can be drawn from the figures referred to in the question for the reasons mentioned in the introduction to last year's return. I have already stated in answer to a previous question the action taken by me with a view to improving the administration of the home work provisions of the Act by the local authorities.

*Factory Inspection and Industrial Diseases.*

Several interesting matters relating to such subjects as factory inspection and industrial diseases were raised when the House went into Committee of Supply on the vote of £198,735 for salaries and expenses in the Home Office.

Mr. GLADSTONE, the Home Secretary, opened the debate with a statement as to the work performed under the direction of his department. Referring to industrial diseases he said that box-wood poisoning had been added to the schedule of the Workmen's Compensation Act as an industrial disease. There had been a considerable increase in the number of cases of anthrax during the year and this had caused him a good deal of trouble. It was very difficult to find a reason for the increase of the disease. He had examined the statistics as to the amount of wool handled, and there seemed to be no relation between it and the number of cases of anthrax. However, the Home Office was doing everything in its power to investigate the subject, to stimulate inquiry, and to encourage the taking of precautions. A meeting of manufacturers and of officials of the department had been taking place to consider the whole question and had not yet terminated. He could only hope that science would suggest an absolute remedy for this terrible disease. At any rate, the department would do everything to devise methods to safeguard workmen. Then as to the question of poisoning by aniline and nitro and amido derivatives of benzene, a committee had sat to inquire into the matter; and such poisoning had been added to the schedule of the Workmen's Compensation Act. Proceeding, the right honourable gentleman said that at present the Home Office was conducting, or others were conducting on its behalf, many important inquiries. There were four Royal Commissions at work on subjects in which his department was particularly concerned—Commissions on Safety in Mines, on Vivisection, on the Metropolitan Police, and on the Care of the Feeble-minded. There were also a number of departmental committees at work. It was intended to start an inquiry into the conditions of labour in places where a high degree of humidity was combined with a high degree of heat. An inquiry which had taken place into an important accident in a match factory showed that the accident was due to causes which originated before the special regulations were brought into force. A return of accidents arising from poisoning was now available early in each year for the whole of the preceding year. The staff of factory inspectors at the Home Office consisted of 110 senior rank men, 13 lady inspectors, five inspectors for textile purposes, and 40 inspectors' assistants—a total of 168. There were 106,000 factories in the country, and it was thus clear that 168 persons, however zealous, could not possibly cover the multifarious duties cast upon them under the Factory and Workshop Act.

Sir CHARLES DILKE, in his speech, referred particularly to phosphorus poisoning in the match trade and to potter's diseases. With regard to phosphorus poisoning he said that the fact that the rules had to be revised showed that we had not reached a satisfactory position. The case as regarded lead poisoning was much stronger indeed. With regard to lead he regretted to find there had been a retrogression. He proceeded to deal with the disease known as potter's rot. After much consideration the departmental committee on compensation for industrial diseases arrived at the conclusion that it was a trade disease sufficiently distinguishable and specific to employment, but it could not recommend the immediate addition of the disease to the schedule. From the terms in which the report referred to this disease it appeared to him that there had been some change of intention at the last moment. The other potter's disease was lead poisoning, and it gave rise to horrible suffering. He was sorry to observe that the reports showed that there was now an increase of lead poisoning generally and that after there had been a considerable decrease. The cases which were the subject of reports passing through the Home Office in 1905 numbered 205, and in 1906 280. The number of cases of poisoning among women in white lead works was rising rapidly, as the statements of inspectors showed. There was a deplorable incidence of plumbism, among girls in particular, in the subsidiary processes, such as transfer making. There had been an increase in plumbism and of fatal cases in china and earthenware works and, horrible as was the suffering involved, the effect on the child population was worse, for there were an enormous infantile mortality and still-birth mortality due to the extensive employment of married women in the earthenware and china works, as the reports of the medical officers of health showed. The duty of the House was to see what could be done by administration and by law to improve this state of affairs. Certain minor defects were pointed out in the existing regulations and he imagined they had been, or would be, remedied. He alluded to such matters as the proper washing of over-alls and clothes and the removal of the moist conditions under which manufacture was sometimes carried on. The increase of lead-poisoning cases could not be explained away and the principal medical inspector dealing in his report with the preparation of hollowware used these terrible words: "All workers at this process become infected." Sir Charles Dilke went on to deal with the controversy as to the use of leadless glaze. Had not the Home Office, he asked, called for reports from Dr. Thorpe and Dr. T. Oliver, and had they not reported in favour of leadless glaze? Some of the Government departments, he regretted to say, did not now insist in their contracts that leadless glaze articles should be supplied to them.

Mr. BRACE urged that if colliery owners did not provide themselves with rescue appliances and breathing apparatus for use in mine disasters within a reasonable time compulsion should be employed to make them do so.

Mr. TENNANT pointed out that in some trades cases of poisoning had occurred from the inhalation of naphtha vapour, and he referred to a case which had been under treatment in the Glasgow Western Infirmary by Dr. Finlayson as an instance of the effect of the vapour on the internal organs. He urged that naphtha poisoning should be scheduled under the Workmen's Compensation Act as an industrial disease.

Mr. HERBERT SAMUEL (the Under-Secretary of State to the Home Department) replied to various points which had been raised in the discussion. It was no doubt lamentable that the figures in lead poisoning again showed an upward tendency. Each case meant a terrible amount of human suffering and it was but a poor consolation

to say that compensation would be paid. The number of cases last year was 632, against 519 for the previous year—a considerable increase; but it should be noted that in 1899 the number was 1268 and in the year 1900 it was 1058. Therefore they had the consolation of knowing that the average number had been reduced by something like 50 per cent. since that time. Although the reduced figures might give some satisfaction they in no sense afforded any reason for the relaxation of efforts to stamp out industrial diseases. The condition of things could not be described as satisfactory until they had been reduced to an absolute minimum. During the past year the Home Office had endeavoured to cope with this question. They had made regulations for the safety of workers in the trade of grinding paints and colours. The earthenware trade regulations were about to be overhauled, and it was hoped that this would effect a large reduction in the cases of lead poisoning. He went on to say that the fish-curing industry was being made the subject of a special inquiry with a view to decide what would be the best mode of revising the regulations with regard to . The inquiry would specially include the question of sanitation which was one of great gravity. The medical inspector's reports on this industry were voluminous but such portions of them as could properly be published would be issued with the report of the inquiry. The Departmental Committee on Industrial Diseases regretted that it could not recommend the scheduling of fibrosis of the lungs, although it was a disease which could be definitely traced to certain industries. In its early stages it was indistinguishable from ordinary cough or bronchitis, and the result of scheduling it would be prejudicial to workmen who might lose their employment on mere suspicion that they were developing the disease. The view of the Committee was supported by the Grinders' Trade Union which urged the Committee not to schedule the disease. Dr. J. S. Haldane took the same view and said that to schedule the disease would be disastrous to the tin mines of Cornwall. Dr. Oliver, one of the greatest authorities on dangerous trades, took the same line and said that on the whole it was not to the advantage of the workmen that this disease should be scheduled. With regard to the suggestion that naphtha poisoning should be scheduled, the Departmental Committee had come to the conclusion after visiting a number of indiarubber factories where the naphtha poisoning was alleged to have taken place that there was no industrial disease due to naphtha. The suggestion of the medical evidence was that the poisoning attributed to the naphtha was due to carbon bisulphide.

*Vivisection.*

Mr. SMEATON (who at a later stage of the proceedings moved the reduction of the vote by £100) complained that the vivisection law of 1876 was habitually disregarded and in some cases flagrantly violated. There was need for greater vigilance in this matter. For the past three years out of 89 581 operations on animals only 93 were made the subject of inspection at a cost of 2550 guineas. That was simply ridiculous—a flagrant waste of public money. There were two inspectors, one getting 500 guineas and the other 330 guineas. These gentlemen, although not at all times officers, received whole-time fees. The inspections were inefficient and far too rare. He considered that the Home Office took no steps to detect or investigate cases of unlicensed vivisection, consequently unlicensed operations would go on. Whereas great jealousy had been shown during the debate in regard to the inspection of workmen, dumb creatures were, in melancholy contrast to this, made the victims of men, who, although they ought to be restrained by the law, were convicted by the Blue-book of gross illegality and positive inhumanity and cruelty. He suggested that the inspectors should be increased in number and the Home Office should be put in a position to judge whether they had conducted their inspections efficiently

Mr. AKERS-DOUGLAS, as one who had held the office of Home Secretary, said that his experience of the Vivisection Act was that its administration as well as the conduct of the inspectors was most humane. He was certain that there was nothing like undue cruelty.

Mr. SMEATON (intervening) said that he never imputed it to the inspectors that they condoned cruelty but that they did not take the opportunity of examining the cases.

Mr. AKERS-DOUGLAS replied that the honourable Member had urged that sufficient care was not taken in granting licences. His experience went to show that every care was taken to see that licences were not scattered broadcast but were granted only to those who were authoritatively recommended.

Mr GLADSTONE, in reply, said that the question of vivisection raised matters of extreme importance and complication. He could only, like his predecessors, exercise such common-sense as he possessed in the endeavour to secure the observance of the law with no want of humanity, but keeping sentiment with considerable strictness within the bounds of reason. It was impossible, he suggested, to carry matters in relation to this subject further pending the report of the Royal Commission. He assured Sir Charles Dilke that there was, and would be, no retrogression in the policy of the Home Office in regard to lead poisoning. They would do all in their power to stem the increase in the number of cases. With regard to life-saving apparatus in mines it was necessary at present to proceed with caution.

The debate on the Home Office Vote had not been concluded at 11 o'clock when it was automatically adjourned.

FRIDAY, JULY 19TH.

*Infantile Mortality in Summer.*

Mr. SUMMERBELL asked the President of the Local Government Board whether infantile mortality among the poorer classes usually rose greatly in the latter part of the summer and early autumn; whether the mortality would be reduced if parents who were unable to pay for a medical man for their children would apply for medical relief at an early stage of the children's illness; and whether he would advise the guardians to give all facilities to such parents to obtain medical relief for the children, and not to make it a debt or to offer it on condition that the parent went into the workhouse.—Mr. JOHN BURNS furnished the following written reply: I am aware that there is usually an increase in infantile mortality in the latter part of the summer and early autumn, especially in hot seasons, and it may be accepted, I think, that competent medical advice and treatment at an early stage of the illness would tend to reduce the mortality. I have, however, no reason to suppose that guardians are unwilling to afford medical relief for children whose parents are unable to provide it, or that persons properly entitled to receive medical relief are deterred from applying for it by the considerations referred to in the last part of the question. If my honourable friend is aware o any cases of failure to give relief to the infants of parents unable to provide it, and will inform me of the particulars of such cases, I will consider them.

MONDAY, JULY 22ND.

*Soldiers Succumb to Heat.*

Mr. FELL asked the Secretary of State for War whether he could give the age of the two privates, Doyle and Sproute, of the 4th Argyll and Sutherland Highlanders, who were stated to have died from the heat on July 16th after the sham fight at Irvine Moor and the average age of the other 35 men who had to go to the hospital on the same occasion.—Mr. HALDANE answered: Private Doyle was 47 years of age and Private Sproute 44 years. Only 11 other cases due to heat were treated and all had returned to duty by the 18th. The average age of these men was 23 years.

*Rabies in Rhodesia.*

Mr. RIDSDALE asked the Under Secretary of State for the Colonies whether a consignment of dog muzzles had been recently ordered by the Rhodesian Administration for the purpose of stamping out rabies among native dogs.—Mr. CHURCHILL replied: It appears from the report of the Medical Director for 1906 that rabies, which first appeared in Southern Rhodesia in 1902, became more prevalent and more generally distributed in 1906 than in any previous year. Regulations were accordingly enacted with regard to the muzzling of dogs and other measures calculated to check the disease, and 20,000 muzzles have been ordered for distribution to natives. The chief native Commissioner of Matabeleland reports that the Matabele are much alarmed at the spread of the disease and are killing their own dogs in large numbers.

*Inoculation for Plague.*

Mr. JOHN ROBERTSON asked the Secretary of State for India whether inoculation for the plague continued to be practised in India in general and the Punjab in particular.—Mr. MORLEY gave the following reply: In all provinces inoculation is offered to the people and is performed free of charge by the district medical staff. In the Punjab of late it has been accepted by increasing numbers. In April last over 21,000 persons were inoculated in that province. The extent to which the remedy is used must necessarily rest with the people themselves, as no one is inoculated against his will.

*The Southern Hospital, Carshalton.*

Mr. CLELAND asked the President of the Local Government Board whether he was aware that a hospital called the Southern Hospital had been erected near Carshalton in Surrey by the Metropolitan Asylums Board; that the hospital was finished at the end of 1906 at a cost of more than £180,000 for expenses of erection, and that it was standing entirely unused at considerable expense of maintenance and danger of deterioration; whether there were any medical purposes to which it could be applied for the alleviation of infectious diseases; and, if so, whether he would direct the Metropolitan Asylums Board to find some use for this institution.—Mr. JOHN BURNS answered: I am aware that the managers have erected this hospital for fever cases and that it is not at present used for that purpose. The question of its use for other purposes has not been lost sight of either by the managers or by the Local Goverment Board, and will be again considered as soon as circumstances permit.

*Mentally Deficient Prisoners.*

Mr. ALDEN asked the Secretary of State for the Home Department whether there were any statistics to show the number of prisoners placed under observation because of their mental condition; what was the policy of the department towards the number who might be classified as irresponsibles; and whether he would be willing to grant a return of such prisoners in all our chief prisons.—Mr. GLADSTONE replied: Both in local and in convict prisons those prisoners who are not certifiably insane but are unfit through mental deficiency for the ordinary penal discipline form a separate class and are specially treated. In the year 1906-07 the numbers were: in local prisons 355 and in convict prisons 107. The policy of the Prison Commissioners is to place these prisoners under the special charge of the medical officers of the prisons and to keep them continuously under the personal care of selected warders. The medical officers regulate their discipline and diet and allow them such employment as is suited to the condition of each individual. In addition to those so classified there are other prisoners temporarily under observation to ascertain their mental state.

*Royal Commission on Sewage Disposal.*

Mr. MITCHELL-THOMSON asked the Secretary of State for the Home Department when the final or further report of the Royal Commission on the Treatment and Disposal of Sewage, which was appointed in 1898, was expected to be ready.—Mr. JOHN BURNS (who replied) said: I understand that the Royal Commission hopes to issue a further report before the end of the year. I also understand that the investigation of the disposal of trade effluents when not mixed with sewage, which will form the subject of the final report of the Commission, has been commenced.

TUESDAY, JULY 23RD.

*Anti-typhoid Inoculations in India and South Africa.*

Sir WILLIAM COLLINS asked the Secretary of State for War whether any official statistics existed in regard to anti-typhoid inoculation of British troops serving in India or in South Africa; if so, whether he would lay them upon the table; whether any order had been issued by the Commander-in-Chief in India in reference to anti-typhoid inoculation; and, if so, whether he would state its terms.—Mr. HALDANE replied (by printed answer): A large number of returns relating to anti-typhoid inoculation have recently been received both from India and South Africa and the work of compiling this information in statistical form is at present in progress, but some considerable time must necessarily elapse before the work is completed. Anti typhoid inoculations are being largely carried out in India under the general direction of the Commander-in-Chief, but the War Office is not aware of the terms of the specific orders issued by him.

*The Plague in India.*

Mr. O'GRADY asked the Secretary of State for India whether he wa

aware that the estimates given by the Indian Statistical Department of the plague victims in the year 1904 varied between highest and lowest in round figures 200,000; and whether he would look into the administration of this department with a view to the matter presented for publication being made intelligible and consistent.—Mr. MORLEY replied: The extreme variation to which my honourable friend calls attention is due to the fact that the higher figure refers to the whole of India, including Native States, and the lower one to British India only. The figure which I quoted in replying to a question on July 8th was taken from a special return recently published by the Government of India and differs from the figure given in its annual sanitary report, from which the statistics given in the Moral and Material Progress Report and the Statistical Abstract are taken. I have asked for an explanation of the discrepancy.

*The Prevention of Cruelty to Children Bill.*

Mr. COURTHOPE asked the Prime Minister whether, in view of the death-rate amongst young children from burning and overlying, he would afford facilities for the passage into law of the Prevention of Cruelty to Children Bill during the present session.—Sir HENRY CAMPBELL-BANNERMAN answered: The time has not yet come to decide on the Bills for which facilities will be given. I believe this Bill has not yet received a second reading.

# Appointments.

*Successful applicants for Vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to* THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week such information for gratuitous publication.*

BONNEY, VICTOR, M.S., M.D. Lond., F.R.C.S., M.R.C.P., has been appointed Hunterian Professor at the Royal College of Surgeons of England.

BOYCOTT, A. E., M.D., B.S. Oxon., has been appointed Gordon Lecturer on Pathology at Guy's Hospital.

COLLIE, R. J., M.D., C.M. Aberd., has been appointed a Medical Referee under the Workmen's Compensation Act, 1906, to be attached to County Court Circuit No. 43.

COPE, V. ZACHARY, M.D., B.S. Lond., has been appointed Resident Medical Officer at the British Lying-in Hospital.

KERR, HAROLD, M.D., Ch.B. Edin., D.P.H. Camb., has been appointed Assistant Medical Officer of Health of the City of Newcastle-upon-Tyne.

JONES, RICHARD, M.B., M.S. Edin., D.P.H. Camb., has been appointed Medical Referee under the Compensation Act for the County Court Circuit of Blaenau Festiniog and Portmadoc.

LESLIE, W. MURRAY, M.D., M.S. Edin., has been appointed Medical Referee under the Workmen's Compensation Act in the City of London.

MACMYN, J., M.D., M.S. Edin., has been appointed Certifying Surgeon under the Factory and Workshop Act for the Kirkcudbright District of the county of Kirkcudbright.

PAUL, V. G. J., M.R.C.S., L.R.C.P. Lond., has been appointed Certifying Surgeon under the Factory and Workshop Act for the Harwich District of the county of Essex.

PEARSE, T. F., M.D. Brux., F.R.C.S. Eng., M.R.C.P. Lond., D.P.H., has been appointed Health Officer to the Corporation of Calcutta.

STRELL, GRAHAM, M.D. Edin., F.R.C.P. Lond., has been appointed Professor of Medicine in the University of Manchester.

# Vacancies.

*For further information regarding each vacancy reference should be made to the advertisement (see Index).*

BIRMINGHAM WORKHOUSE INFIRMARY.—Assistant Resident Medical Officer. Salary £104 per annum, with apartments, rations, &c.

BRADFORD CHILDREN'S HOSPITAL.—House Surgeon. Salary £100.

BRADFORD POOR LAW UNION HOSPITAL AND WORKHOUSE.—Resident Assistant Medical Officer, unmarried. Salary £100, with rations, apartments, and washing.

BRIGHTON AND HOVE HOSPITAL FOR WOMEN.—House Surgeon, unmarried. Salary £80 per annum, with apartments, board, gas, coal, and attendance.

CAIRO, SCHOOL OF MEDICINE (EGYPTIAN GOVERNMENT, MINISTRY OF EDUCATION).—Assistant to the Professor of Pathology. Salary £E. 320 per annum.

CAMBRIDGE, CAMBRIDGESHIRE LUNATIC ASYLUM, Fulbourn.—Second Assistant Medical Officer, unmarried. Salary £120 per annum, with board, lodging, and attendance.

CANCER HOSPITAL, Fulham-road, London, S.W.—Two Assistant Anæsthetists. Honorarium of 25 guineas each.

CARDIFF INFIRMARY (GENERAL HOSPITAL).—House Physician for six months. Salary £50, with board, residence, and laundry.

CARMARTHENSHIRE INFIRMARY.—Resident Medical Officer, unmarried. Salary £100 per annum, with apartments, board, attendance, &c.

CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST, Victoria Park, E.—House Physician, for six months. Salary at rate of £50 per annum, with board, washing, and residence.

COVENTRY AND WARWICKSHIRE HOSPITAL.—Junior House Surgeon for six months. Salary £60 per annum, with rooms, board, washing, and attendance.

DEVON COUNTY ASYLUM.—Assistant Medical Officer. Salary £140, with board, apartments, and laundry.

DEVONPORT, ROYAL ALBERT HOSPITAL.—Resident Medical Officer, unmarried. Salary £100 per annum, with apartments, board, &c.

"DREADNOUGHT" HOSPITAL, Greenwich.—Pathologist. Salary £100 per annum.

EGYPT, PUBLIC HEALTH DEPARTMENT.—Sub-Inspector of Ophthalmic Hospitals.

GLOUCESTER, GENERAL INFIRMARY AND THE GLOUCESTERSHIRE EYE INSTITUTION.—Assistant House Surgeoncy for six months. Salary at rate of £30 per annum, with board, residence, and washing.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.—House Physician, House Surgeon, Assistant Casualty Officer.

HULL, ROYAL INFIRMARY.—Casualty House Surgeon. Salary £50, with board and lodging.

IPSWICH, EAST SUFFOLK AND IPSWICH HOSPITAL.—Third House Surgeon. Salary £50 per annum, with board, attendance, and washing.

KENSINGTON GENERAL HOSPITAL, Earl's Court, London, S.W.—Junior Resident Medical Officer for six months. Salary £40 per annum, with board, washing, and residence.

LANCASTER, ROYAL LANCASTER INFIRMARY.—House Surgeon, unmarried. Salary £100 per annum, with residence, board, attendance, and washing.

LINCOLN COUNTY HOSPITAL.—Junior House Surgeon, unmarried, for six months. Salary £30, with board, residence, and washing.

LIVERPOOL, ROYAL SOUTHERN HOSPITAL.—Resident Pathologist and Registrar. Salary £100, with board and residence.

LONDON UNIVERSITY.—Roger's Prize, 1908.

LOUGHBOROUGH AND DISTRICT GENERAL HOSPITAL AND DISPENSARY.—Resident House Surgeon. Salary £100 a year, with rooms, attendance, board, and washing.

METROPOLITAN ASYLUMS BOARD FEVER HOSPITALS SERVICE.—Assistant Medical Officers, unmarried. Salary £180, rising to £240 per annum, with board, lodging, and washing.

MICKLEOVER, DERBY COUNTY ASYLUM.—Junior Assistant Medical Officer. Salary £120, rising to £150 per annum, with apartments, board, washing, and attendance.

NORFOLK AND NORWICH HOSPITAL.—House Surgeon. Salary £80 per annum, with board, lodging, and washing. Also Two Assistant House Surgeons for six months. Salary £20, with board, lodging, and washing.

NORTH-EASTERN HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Physician for six months. Salary at rate of £60 per annum, with board, residence, and laundry.

NORWICH, JENNY LIND INFIRMARY FOR CHILDREN, Unthank-road.—Resident Medical Officer (female). Salary £50 per annum, with board, residence, and laundry.

PAISLEY, INFECTIOUS DISEASES HOSPITAL.—Assistant Medical Officer. Salary £100 per annum, with board, washing, and attendance.

PERTH ROYAL INFIRMARY.—House Surgeon. Salary £60, with board.

PLAISTOW FEVER HOSPITAL, London, E.—Second Assistant Medical Officer for six months. Salary at rate of £100 per annum, with board, &c.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL HOSPITAL.—House Physician for six months, renewable. Salary £50, with board, residence, and washing.

QUEEN CHARLOTTE'S LYING-IN HOSPITAL, Marylebone road, N.W.—Resident Medical Officer for four months. Salary at rate of £50 per annum, with board, residence, and washing.

ROCHDALE AND DISTRICT DEAF AND DUMB SOCIETY.—Missioner.

ROYAL DENTAL HOSPITAL, Leicester-square.—Morning House Anæsthetist. Salary £50 per annum.

ROYAL EYE HOSPITAL, St. George's-circus, S.E.—Refraction Assistant. Salary £40 per annum. Also Clinical Assistants.

SALFORD ROYAL HOSPITAL.—Junior House Surgeon. Salary at rate of £50 per annum, with board and residence.

SOUTHPORT INFIRMARY.—Residents' Senior House Surgeon. Also Junior House and Visiting Surgeon, unmarried, for six months. Salary of Senior at rate of £90 per annum, and of Junior £70 per annum, with residence, board, and washing.

STAFFORD, STAFFORDSHIRE COUNTY ASYLUM.—Assistant Medical Officer, unmarried. Salary £150, rising to £200, with apartments, board, and washing.

STOCKPORT INFIRMARY.—House Surgeon. Salary £100 per annum, with board, washing, and residence. Also Assistant House and Visiting Surgeon. Salary £80 per annum, with board, washing, and residence.

SUNDERLAND INFIRMARY.—House Physician and Pathologist, also House Surgeon. Salary in each case £80 per annum, with board, residence, and washing.

TAUNTON, TAUNTON AND SOMERSET HOSPITAL.—House Surgeon. Salary £100 per annum, with board, lodging, and laundry. Also Resident House Surgeon for six months. Salary at rate of £50 per annum, with board, lodging, and laundry.

TEIGNMOUTH HOSPITAL, South Devon.—House Surgeon. Salary £70 a year, with board, lodging, and washing.

WESTERN GENERAL DISPENSARY, Marylebone-road, N.W.—Honorary Anæsthetist.

WHITEHAVEN AND WEST CUMBERLAND INFIRMARY.—Resident House Surgeon. Salary £120 a year, with board and lodging.

YORK DISPENSARY.—Resident Medical Officer, unmarried. Salary £120 a year, with board, lodging, and attendance.

ZANZIBAR GOVERNMENT.—Bacteriologist. Salary £300 a year, rising to £400, with free quarters, &c.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy as Certifying Surgeon under the Factory and Workshop Act at Market Harborough, in the county of Leicester.

# Births, Marriages, and Deaths.

## BIRTHS.

GEDDES.—On July 20th, at Redhouse, South Gillsland-road, Edinburgh, the wife of A. Campbell Geddes, M.B., of a son.

MACDONALD.—On July 18th, at Argyll-square, Oban, the wife of Duncan MacDonald, M.D. & C.M., of a son.

## DEATHS.

HODGE.—On July 21st, at Kuling, China, the Rev. Sydney Rupert Hodge, M.R.C.S., L.R.C.P., aged 48.

STOCKER.—On July 18th, at Hillingdon, John Sherwood Stocker, M.D. Lond., M.R.C.P.

# Notes, Short Comments, and Answers to Correspondents.

## THE AMERICAN QUACK.

IN our issue of Feb. 3rd, 1906, p. 347, we commented upon the doings and advertisements of the American quack who calls himself C. J. Macaura. His field of action at that time was apparently Bradford and Newcastle-upon-Tyne, but now he seems to have moved to Hull. In the *Hull Mail* of June 18th is a paragraph quoted from the *Bradford Daily Argus*. It is headed in the usual deceptive way of quacks who quote the names of electrical experts to further their own ends, "Remarkable Statement by Edison." The statement attributed to Edison is as follows: "It is my firm belief that if electricity was thoroughly understood by the medical profession and scientifically applied, humanity would be the gainer to such an extent that the old system of drugging would soon be forgotten." The rest of the article is mainly devoted to saying that "Dr. Macaura" does understand electricity and can apply it scientifically, with, of course, the usual amazing cures. Internal evidence seems to show that the paragraph was written by Macaura himself, for we read, "We have right here in Hull many striking examples ....." How any respectable newspaper can be a party to inserting such matter we cannot understand.

## A PLEA FOR VENESECTION.

*To the Editors of* THE LANCET.

SIRS,—It is always unwise to criticise the treatment of a case you have not seen, so that I will not follow "G.P.'s" example (THE LANCET, July 20th, p. 204) in referring to the recent sudden death in the House of Commons except as a peg on which to hang some remarks on venesection. A case which I saw in consultation with Dr. J. Russell Ryan and Mr. G. R. Radmore last October well illustrates the excellent result which often attends upon a timely venesection. The patient was a fat, flabby lady, aged 64 years. The history I obtained was that except for some mental excitement she was in her usual health in the morning. About noon she was seized with right-sided twitching and an hour later she became unconscious. When we met in consultation at 2.30 P.M. the patient was comatose, with conjugate lateral deviation of the eyeballs and right-sided convulsive movements. Her face was cyanosed. I at once advised venesection and she was bled to ten ounces. Even while the blood was running the movements abated and soon afterwards ceased and the cyanosis disappeared. The patient gradually regained consciousness and in the course of a week or ten days she was much in her usual condition physically, though mentally she remained rather feeble. I think that this was certainly a case in which life was saved by venesection. In these cerebral cases much depends on the promptness of the withdrawal of the blood; if there be delay irretrievable damage may be done. In a case which I saw earlier in the autumn the patient, a man, aged 65 years, after having been comatose for 48 hours regained consciousness as soon as he was bled and lived for two or three months, dying eventually from uræmia. So that though early venesection should be the rule there are cases in which it does good, even though the patient has been unconscious for many hours.

It is to be hoped that the present generation of medical men will estimate at its true value a method of treatment which was much abused at one time but which fell into undeserved neglect.

I am, Sirs, yours faithfully,

July 22nd, 1907. F. DE HAVILLAND HALL.

## NOISY STREETS AND HOUSE PROPERTY IN LONDON.

AT a meeting of the Street Noise Abatement Committee on July 20th it was stated that the motor-omnibus and traction-engine traffic had, in the course of two years, depreciated the value of house property in London to the extent of fully £6,000,000, whilst every week of the existing state of things was adding thousands of pounds to the loss that was being incurred by property owners.

## TRUE CLEANLINESS.

*To the Editors of* THE LANCET.

SIRS,—One fertile source of contempt in the Anglo-Indian for the Indian native is the absence of the pocket-handkerchief as an intermediary in the blowing of native noses. The native retorts that his practice is far cleaner than that of the northern European who puts a quantity of uncleanly stuff—most likely full of disease germs, one may conclude—to ferment in a hot, steamy breast pocket. Just the same contempt is felt for the same reason by the north Italians for the south Italians—in particular for the Neapolitans. This race, being quick and intelligent, long before official science, discovered the infectiousness of tuberculosis; in fact, *crede experto*, a person with a mere bronchial catarrh, unless he conceal it, cannot hire a room for love or money among the peasantry round about Naples. How can we fail to correlate these facts and infer, unless science disprove it by actual observation, that the wipe, now also universal among the masses who do not scent it as a rule, is a source of consumption, catarrh, &c., among them? Pocket-handkerchiefs are also not made use of by the Chinese, who, as regards personal cleanliness, from lowest to the highest—as, e.g., in brushing the teeth, using toothpicks, cleansing the mouth and hands before and after meals, and a number of other things—are much more particular than the bulk of our people. In their case the short open nose, and absence of hair upon the face, render the practice comparatively unobjectionable, but it would not be tolerated amongst a highly refined people like the English, with long noses, an intolerable amount of thick fur about the face, and a climate which develops an excessive amount of nasal mucus.

The only prophylactic that one can suggest is some good antiseptic scent, to be used on the pocket-handkerchief even more scrupulously by the plebeian of the slum than by the peer.

I am, Sirs, yours faithfully,

W. W. STRICKLAND, B.A. Trin. Coll., Cambridge.

Singapore, June 21st, 1907.

## AUGUST BANK HOLIDAY ON THE CONTINENT.

TICKETS at reduced fares available for eight days will be issued by the Great Eastern Railway to Brussels, July 31st, August 1st, 2nd, 3rd, and 5th, and to Zürich, viâ Harwich and Antwerp. For visiting the Hague, Scheveningen (the Dutch Brighton), and Amsterdam for the dead cities of the Zuyder Zee, special facilities are offered viâ the Company's British Royal Mail Harwich-Hook of Holland route. For the convenience of passengers tickets dated in advance can be obtained at the Liverpool-street Station Continental Inquiry and Booking Offices.

## A DISCLAIMER.

*To the Editors of* THE LANCET.

SIRS,—I crave the courtesy of your columns to warn medical men against one who is obtaining access to their hospitality and assistance by pretending that he is sent to them by me. The man is question (aged about 40, dressed as a ship's surgeon) does not deserve the charity he claims.

I am, Sirs, yours faithfully,

ARTHUR KEITH, M.D. Aberd.

London Hospital Medical College, July 22nd, 1907.

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*Alpha.*—The figures refer, no doubt, to some form used in the institution for purposes of registration. They may indicate the character of the neuritis, but that depends upon the method of registration adopted by the hospital. There is no form of registration common to all such institutions. We have not the slightest idea what the figures mean nor is the board in question intended to convey either to the patient or to his friends the nature of his disease. The board is for the use of the hospital authorities and their staff.

**COMMUNICATIONS not noticed in our present issue will receive attention in our next.**

# Medical Diary for the ensuing Week.

## OPERATIONS.

### METROPOLITAN HOSPITALS.

**MONDAY (29th).**—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), St. George's (2 P.M.), St. Mary's (2.30 P.M.), Middlesex (1.30 P.M.), Westminster (2 P.M.), Chelsea (2 P.M.), Samaritan (Gynæcological, by Physicians, 2 P.M.), Soho-square (2 P.M.), City Orthopædic (4 P.M.), Gt. Northern Central (2.30 P.M.), West London (2.30 P.M.), London Throat (9.30 A.M.), Royal Free (2 P.M.), Guy's (1.30 P.M.), Children, Gt. Ormond-street (3 P.M.), St. Mark's (2.30 P.M.).

**TUESDAY (30th).**—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), Guy's (1.30 P.M.), Middlesex (1.30 P.M.), Westminster (2 P.M.), West London (2.30 P.M.), University College (2 P.M.), St. George's (1 P.M.), St. Mary's (1 P.M.), St. Mark's (2.30 P.M.), Cancer (2 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square (9.30 A.M.), Soho-square (2 P.M.), Chelsea (2 P.M.), Central London Throat and Ear (2 P.M.), Children, Gt. Ormond-street (2 P.M., Ophthalmic, 2.15 P.M.), Tottenham (2.30 P.M.).

**WEDNESDAY (31st).**—St. Bartholomew's (1.30 P.M.), University College (2 P.M.), Royal Free (2 P.M.), Middlesex (1.30 P.M.), Charing Cross (3 P.M.), St. Thomas's (2 P.M.), London (2 P.M.), King's College (2 P.M.), St. George's (Ophthalmic, 1 P.M.), St. Mary's (2 P.M.), National Orthopædic (10 A.M.), St. Peter's (2 P.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Gt. Northern Central (2.30 P.M.), Westminster (2 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Cancer (2 P.M.), Throat, Golden-square (9.30 A.M.), Guy's (1.30 P.M.), Royal Ear (2 P.M.), Royal Orthopædic (3 P.M.), Children, Gt. Ormond-street (9.30 A.M., Dental, 2 P.M.), Tottenham (Ophthalmic, 2.30 P.M.).

**THURSDAY (1st).**—St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), University College (2 P.M.), Charing Cross (3 P.M.), St. George's (1 P.M.), London (2 P.M.), King's College (2 P.M.), Middlesex (1.30 P.M.), St. Mary's (2.30 P.M.), Soho-square (2 P.M.), North-West London (2 P.M.), Gt. Northern Central (Gynæcological, 2.30 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square (9.30 A.M.), Guy's (1.30 P.M.), Royal Orthopædic (9 A.M.), Royal Ear (2 P.M.), Children, Gt. Ormond-street (2.30 P.M.), Tottenham (Gynæcological, 2.30 P.M.).

**FRIDAY** (2nd).—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), Guy's (1.30 P.M.), Middlesex (1.30 P.M.), Charing Cross (3 P.M.), St. George's (1 P.M.), King's College (2 P.M.), St. Mary's (2 P.M.), Ophthalmic (10 A.M.), Cancer (2 P.M.), Chelsea (2 P.M.), Gt. Northern Central (2.30 P.M.), West London (2.30 P.M.), London Throat (9.30 A.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square (9.30 A.M.), City Orthopædic (2.30 P.M.), Soho-square (2 P.M.), Central London Throat and Ear (2 P.M.), Children, Gt. Ormond-street (9 A.M., Aural, 2 P.M.), Tottenham (2.30 P.M.), St. Peter's (2 P.M.).

**SATURDAY** (3rd).—Royal Free (9 A.M.), London (2 P.M.), Middlesex (1.30 P.M.), St. Thomas's (2 P.M.), University College (9.15 A.M.), Charing Cross (2 P.M.), St. George's (1 P.M.), St Mary's (10 P.M.), Throat, Golden-square (9.30 A.M.), Guy's (1.30 P.M.), Children, Gt. Ormond-street (9.30 A.M.).

At the Royal Eye Hospital (2 P.M.), the Royal London Ophthalmic (10 A.M.), the Royal Westminster Ophthalmic (1.30 P.M.), and the Central London Ophthalmic Hospitals operations are performed daily.

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

**MONDAY** (29th).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith road, W.).—2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Dunn: Diseases of the Eye. 2.30 P.M.: Operations.

**TUESDAY** (30th).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—10 A.M.: Dr. Moullin: Gynæcological Operations. 2 P.M.: Medical and Surgical Clinics. X Rays. Dr. Ball: Diseases of the Throat, Nose, and Ear. 2.30 P.M.: Operations. Dr. Abraham: Diseases of the Skin.

**WEDNESDAY** (31st).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—10 A.M.: Dr. Ball: Diseases of the Throat, Nose, and Ear. Dr. Saunders: Diseases of Children. 2 P.M.: Medical and Surgical Clinics. X Rays. 2.30 P.M.: Operations. Dr. Robinson: Diseases of Women.

**THURSDAY** (1st).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—2 P.M.: Medical and Surgical Clinics. X Rays. Mr. Dunn: Diseases of the Eye. 2.30 P.M.: Operations.

**FRIDAY** (2nd).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—10 A.M.: Dr. Moullin: Gynæcological Operations. 2 P.M.: Medical and Surgical Clinics. Dr. Ball: Diseases of the Throat, Nose, and Ear. X Rays. 2.30 P.M.: Operations. Dr. Abraham: Diseases of the Skin.

**SATURDAY** (3rd).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—10 A.M.: Dr. Ball: Diseases of the Throat, Nose, and Ear. 2 P.M.: Medical and Surgical Clinics. X Rays. 2.30 P.M.: Operations. Dr. Robinson: Diseases of Women.

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*Lectures, original articles, and reports should be written on one side of the paper only*, AND WHEN ACCOMPANIED BY BLOCKS IT IS REQUESTED THAT THE NAME OF THE AUTHOR, AND IF POSSIBLE OF THE ARTICLE, SHOULD BE WRITTEN ON THE BLOCKS TO FACILITATE IDENTIFICATION.

*Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.*

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*Letters relating to the publication, sale and advertising departments of* THE LANCET *should be addressed "To the Manager."*

*We cannot undertake to return MSS. not used.*

## MANAGER'S NOTICES.

### THE INDEX TO THE LANCET.

THE Index to Vol. I. of 1907, which was completed with the issue of June 29th, and the Title-page to the Volume, were given in THE LANCET of July 6th.

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## METEOROLOGICAL READINGS.

*(Taken daily at 8.30 a.m. by Steward's Instruments.)*

THE LANCET Office, July 25th, 1907.

| Date. | Barometer reduced to Sea Level and 32° F. | Direction of Wind. | Rainfall. | Solar Radio in Vacuo. | Maximum Temp. Shade. | Min. Temp. | Wet Bulb. | Dry Bulb. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| July 19 | 30·13 | N.E. | ... | 113 | 78 | 55 | 56 | 57 | Fine |
| ,, 20 | 30·12 | E. | ... | 113 | 75 | 57 | 58 | 62 | Fine |
| ,, 21 | 30·15 | E. | ... | 72 | 69 | 56 | 57 | 59 | Overcast |
| ,, 22 | 29·95 | S.W. | 0·07 | 105 | 71 | 57 | 59 | 59 | Raining |
| ,, 23 | 29·89 | N.E. | 0·66 | 87 | 62 | 52 | 52 | 53 | Cloudy |
| ,, 24 | 29·94 | E. | ... | 104 | 67 | 51 | 54 | 58 | Fine |
| ,, 25 | 29·91 | E. | ... | 105 | 64 | 52 | 53 | 58 | Fine |

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